

New Jersey May/June 1988  
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# Outdoors



# New Jersey Outdoors

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Pine Barrens Treefrog perched on a Pine Cone. Photograph by Robert T. Zappalorti.

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Ruby-Throated Hummingbird. Painting by Carol Decker

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Trout Fisherman on Ken Lockwood Gorge. Photograph by Greg Johnson

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## NEW JERSEY OUTDOORS CREDO

*This publication is dedicated to the wise management and conservation of our natural resources and to the fostering of greater appreciation of the outdoors. The purpose of this publication is to promote proper use and appreciation of our natural, cultural, and recreational resources, and to provide information that will help protect and improve the environment of New Jersey.*

# From the Editor

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## Vacation Season Kickoff

The Memorial Day weekend at the end of May ushers in the summer vacation season. A few weeks later school is out and the season of suntans, beach walks, canoeing, fishing and picnicking is in full swing. It is also the season of mosquitos, chiggers and poison ivy, to name a few minor annoyances.

And this is the season we receive letters asking about locations, detail maps and other information about recreation areas, parks, lakes, camping sites and whatever else readers ask about. And every year we provide the following:

- Vacation Kit
- Calendar of Events
- Cultural Guide
- Marinas and Boat Basin Guide
- Beach Guide
- Campsite Guide
- Mini Tours Guide. All the above guides are available from:

New Jersey Division of Travel and Tourism CN 348, Trenton, NJ 08625, (609) 292-2470

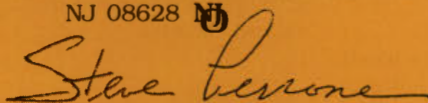
- What's Happening—A schedule of special events held at State Parks and Forests this summer

- A year-round guide, "New Jersey Invites You To Enjoy its State Forests, Parks, Natural Areas, Marinas, Historic Sites, Wildlife Management Areas" from:

Division of Parks and Forestry  
State Park Services  
CN 404, Trenton, NJ 08625  
(609) 292-2797

- For the more adventurous, a set of 10 recreation maps (plus canoe safety information) of the Delaware River is available for a fee of \$5.00 (plus postage: \$1.25 1st class; \$1.00 3rd class). Schuylkill River set of 8 maps, water-proofed, covers area from Tamaqua Dam to Fairmount Dam in Philadelphia. Price \$5.00 (plus postage: 1st class, \$1.05, 3rd class, \$1.00). Send check or money order to:

Delaware River Basin  
Commission  
P.O. Box 7360, West Trenton,  
NJ 08628



## In this Issue

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In *Seashore Summer School '88*, author Cathie Cush writes about summer fun and summer learning about nature and other things.

Author Patty McConnell writes about New Jersey's capture-and-tagging program in the article, *Black Bear Research*.

Two new writers, Jim Lee and Joe Hannan, provide us with an unusual insight into *The Morris Canal and Its People*, an article about the people who built and worked on the canal.

Check the map included with the article *Cycling in the Pequest Valley* by Frank T. Dale and you'll surely take the tour. How can you resist names like Tranquility, Allamuchy, and Dark Moon Road!

In the article *Get Set for Fluke*, author Russ Wilson tells us how, when, and where to catch your share of summer flounder.

The Natural Resource Education articles by Jan McDowell on pages 17 and 18, and Carolyn De Vries on page 19, are components of a mailer discussed on page 20.

A new author, William A. Coughlin, writes about *Canoeing on the Maurice* and the appearance of the "lurid river creature."

Marine geologist Susan D. Halsey, of DEP's Coastal Resources Division, writes about *Hurricane A Comin'* The hurricane season in our area is from June 1 to November 30.

Writer/photographer Mark Warner provided us with text and photographs of the tiny *New Jersey TreeFrogs*.

*Clean Water is Everybody's Business* was written by Helen Lippman Collins. Her message is adopt a lake, stream or lagoon—and then look after it like a parent.

*The Revolutionary War's Longest Day* occurred in New Jersey on the present site of Monmouth Battlefield State Park. Author Allen G. Eastby wasn't there but he should know as a published historian.

Our Wildlife in New Jersey series features the *Ruby-Throated Hummingbird* by Dave Chanda. The painting on the inside back cover is by Carol Decker.

# Seashore Summer School '88

BY CATHIE CUSH

The first few weeks of June can be a torture to a 10- or 12-year-old. I remember sitting in many a stuffy classroom with one sleepy eye on the classwork in front of me and the other focused longingly on the window. Then I'd look over to the big wall calendar and count the blocks until The Last Day Of School.

As a kid, I lived for summer. I still do. But back then summer meant a whole season at the shore, staying with my grandparents in Beach Haven, and soaking up all Long Beach Island had to offer. Ah, summer vacation!

It's somewhat ironic, then considering the eagerness with which I awaited the end of school, that I've associated summer with learning. Perhaps it's because in the summer I learned the things that stuck with me longest—about nature, about people, about work.

At any rate, I still live for summer and I still love to learn. And I suspect I'm not alone, judging from the number of programs available for vacationers and others who want a good answer to the classic essay question: "What did I do on my summer vacation?"

## Where am I?

To too many people, the Jersey shore is just a spot on a towel on a patch of sand, or a boardwalk or a cluster of boutiques and T-shirt shops. It's that, too, but it's a marvelous ecosystem populated with fascinating critters both large and small. If catching rays is as much activity as you want to pursue, that's fine, but the shore is a tremendous resource for the adventuresome, too.

Night walks along the beach at Sandy Hook are one of the many popular activities sponsored by the American Littoral Society. The walks combine informal lectures on biology, astronomy and other topics with a view of the beach that many vacationers might not see. And the naturalists who lead the walks can offer insights into many phenomena that the walkers otherwise might not notice. For instance, you might learn that those pesky bugs known as sand fleas are not one type of animal but a number of different species of amphipods, each of which has a different kind of mouth. Or that ghost crabs—tiny, pale crustaceans that spend their days in burrows beneath the sand—can be "caught" in the beam of a flashlight when they come out at night.

The society's day-long walks at Island Beach State Park give participants an opportunity to study a transect of the island from bay to ocean. By looking at the plant and animal life, as well as at shoreline dynamics, the group can get an understanding of how a barrier island "works."

## What is it?

The mysteries of the marshes are unraveled through guided walks at the Wetlands Institute in Stone Harbor. Offered three times a day, the walks begin with an orientation movie and are free with admission to the institute.

On Saturday evenings, the organization hosts a lecture series for those interested in the area's natural history. In summers past, guest speakers have discussed marine mammals and other sea life as well as wildflowers, birds and other topics. This summer the Institute will hold a Fish Festival in early July. Fishing exhibits and workshops are planned for the afternoon; the evening's highlight will be a "Catch of the Day" gourmet seafood preparation program.

Youngsters who don't dread the thought of summer school can take one of the Institute mini classes, which are offered for preschooler through sixth graders during June, July and August. The week-long classes run two hours a day. Students learn about marsh and beach ecology by doing science projects, arts and crafts and other hands-on activities such as seining.

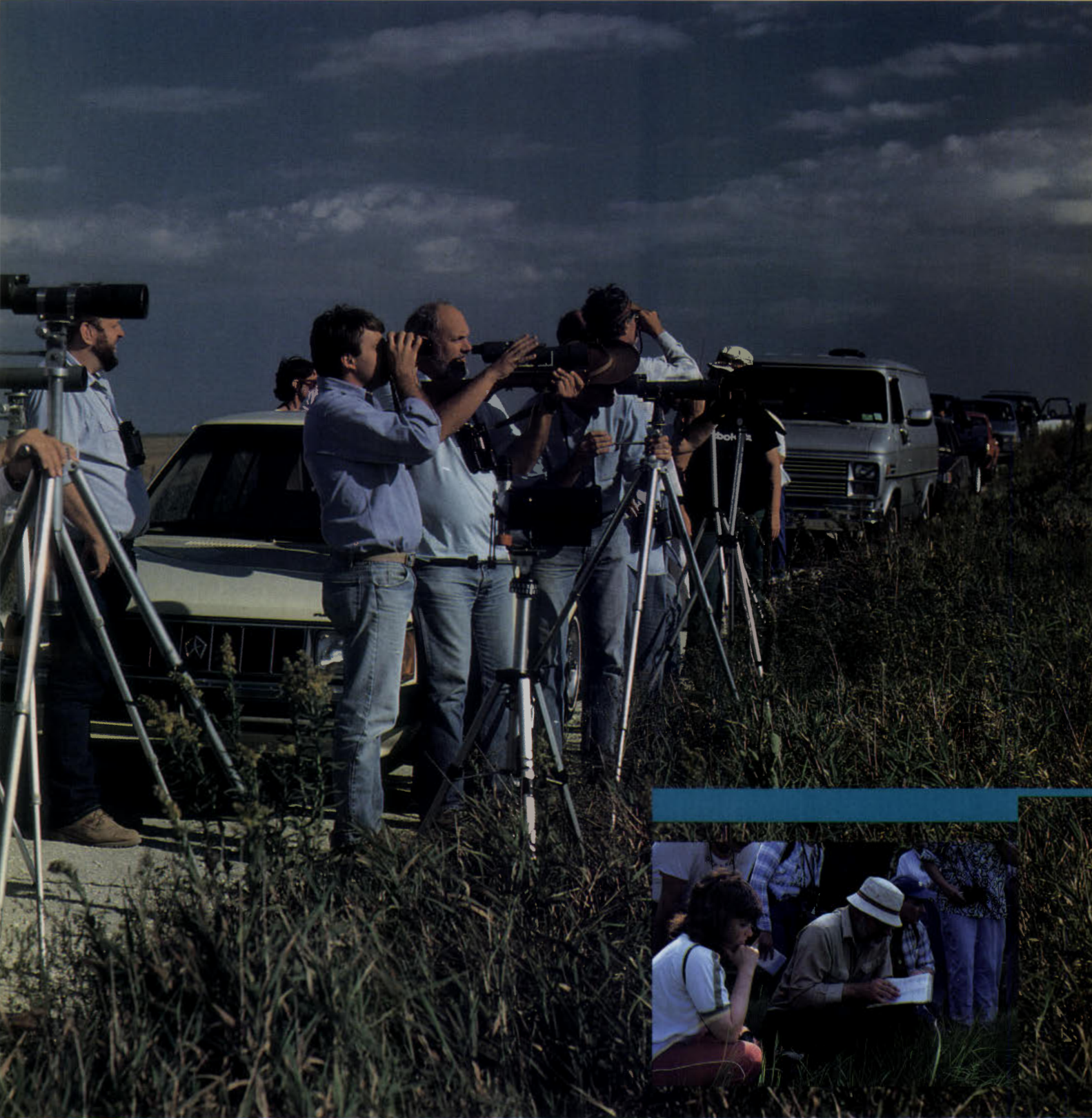
Seining, using a fine net to collect specimens of aquatic life, isn't limited to children. Anyone who is curious about what lives beneath the surface of the bay can take part in the seining programs sponsored by the Ocean County Department of Parks and Recreation. Groups are limited to 25 people, so everyone who wants to can have an opportunity to learn



*Birdwatchers at the  
Brigantine Wildlife  
Refuge.*

*Group on a botanical  
identification outing.*

PHOTOGRAPHS BY CORNELIUS HOGENBIRK



how to use the nets to retrieve specimens from the water. Then, the county naturalists who escort you will identify the catches, which usually include blueclaw and spider crabs, hogchokers, snappers, sticklebacks, pipefish, baitfish such as spearing and killies, jellyfish and more. At the end of the summer, a few stray tropical fish are occasionally found among the local species.

The department also takes small groups on interpretive nature tours of the bay via jon boat. And if you really want to get a fish's eye view of the area, county naturalists run snorkeling clinics at several sites on Barnegat Bay. After a short session on how to use mask, fins and snorkel, you'll explore areas behind Island Beach State Park and near some of the smaller islands in the bay, depending on where visibility is best on a particular day.

#### Where's the action?

Snorkelers are often surprised at how much there is to see in New Jersey waters, thousands of miles from the nearest coral reef. Those whose appetites are whetted (or should I say "wetted"?) might want to try scuba diving. With literally thousands of shipwrecks and an abundance of marine life, New Jersey boasts some of the best diving in the world.

Scuba certification is easy to obtain. Any of the more than two dozen dive shops throughout the state offer lessons, and many of those in the shore area tailor classes to the vacationer's schedule. Training involves approximately 30 hours of classroom and pool work, followed by a day of diving at a lake or quarry, then a dive from a boat on a shallow site in the ocean. Therein lies the key to another world.

All summer long (spring and fall, too) boats carry the growing number of Jersey divers to wrecks from the New York Bight to Cape May. Once you've jumped overboard and headed down the anchor line, you can pursue your particular interests—hunting for lobster, spearing fish, retrieving brass portholes and other artifacts, taking pictures or just seeing the sights.

If you'd rather stick to topside sightseeing, you can take one of the interpretive offshore boat tours offered by various environmental organizations and parks departments. Participants will see all sorts of bird life and may see whales, turtles, sunfish and other sea life.

Those who want to take the helm themselves might be interested in safe boating courses offered by the local Coast Guard Auxiliary. Or you might want to try your hand at the tiller of a sailboat. Lessons are available by the hour from many sailboat liveries, and it's possible to pick up the basics in three or four hours. Many experts recommend taking

lessons in a day sailer, rather than in a smaller Sunfish. The day sailor offers the student an opportunity to learn to work two sails, and simplifies the transition to a larger vessel.

Then again, you may prefer something small. In that case, give boardsailing a try. This sport, essentially sailing on a modified surfboard, demands a bit of patience, but *aficionados* say the exhilaration is worth it. Lessons take about half a day and often incorporate trial "sails" on a motion synthesizer. But to get good, boardsailers say, takes hours of practice and a good bit of upper body strength.

If all the above sounds like too much work for a vacation, don't overlook other opportunities to learn. Many of the shore resorts boast fine museums dedicated to local and natural history. In addition to regular exhibits, many of these offer summer lecture series that are open to the public. Art and community centers along the shore also offer classes, films and lectures of all sorts that are open to non-members; often, short-term membership is available for vacationers.

Remember, eventually your golden tan will fade, the postcards and Polaroids will yellow and the T-shirts will find their way into the rag bag. This summer, get a vacation souvenir that you'll have forever.

#### For Your Information

It would be impossible to compile a comprehensive listing of all the workshops, seminars, classes, lessons and other programs along the Jersey shore this summer. For more detailed information, request the 1988 New Jersey Calendar of Events from the New Jersey Division of Travel and Tourism, CN 826, Trenton, NJ 08625. You might also want to contact the chamber of commerce in your vacation community. Ask your realtor for the address and phone number. Also, many activities are listed in the calendar sections of the local papers.

For information on specific programs, contact:

- Island Beach State Park, (201) 793-0506
- Barnegat State Park, (609) 494-2016
- The American Littoral Society, (201) 291-0055
- The Wetlands Institute, (609) 368-1211
- Atlantic County Department of Parks and Recreation, (609) 645-5960
- Cape May County Chamber of Commerce, (609) 465-7181
- Monmouth County Office of Tourism, (201) 431-7310
- Ocean County Department of Parks and Recreation, (201) 506-9090/(201) 370-7380

#### Other Activities

If you're a landlubber, you're not left out when it comes to learning. In fact, the opportunities are almost limitless.

Many of the organizations that sponsor beach walks also offer guided nature walks through the Pine Barrens and other significant areas in the state. Along the way naturalists will point out interesting specimens of animal and plant life and offer insights into the ecosystem being explored. And with 1.1 million acres of pinelands alone, New Jersey offers plenty to be explored.

One way to get off the beaten trail is to travel by canoe—although this method has gotten so popular that Jersey's waterways are often as well-traveled as its highways. Canoeing is an easy, learn-as-you-go activity that provides a relaxing opportunity to soak up the scenery. When the trip's guided by someone who knows the area's history, flora and fauna, it can be particularly rewarding.

If you'd rather, ride horseback. You can learn enough to get by in an hour or two, and seeing the Pine Barrens from the back of a beast offers a totally different perspective. Lessons are available from most liveries.

No matter where you spend your summer, you'll find myriad opportunities to enrich yourself and any number of organizations and resources to help you make the most of your vacation.



*Approaching bear with tranquilizer needle mounted on pole.*

# Black Bear Research

New Jersey's black bear experienced a resurgence in the late seventies following an expansion in Pennsylvania's population. By 1981, the number of reported black bear sightings in this state had increased twenty-fold over that recorded in 1977 (see "Bears ... in New Jersey?" NJO Nov-Dec 1987). If the black bear were to thrive and coexist with man, the Division of Fish, Game and Wildlife needed to obtain information about them and develop management plans for the future.

Questions about sex and age, reproduction and travel patterns could best be answered by a "capture-and-tagging" study. Pennsylvania's black bear biologist, Gary Alt, spent many hours instructing Division personnel in the capture and handling of black bear. John O'Pezio, New York's black bear biologist, loaned New Jersey 10 radio collars. In 1981, New Jersey began its capture-and-tagging program.

A combination of barrel traps and Aldrich leg snares were used to capture bears in the Kittatinny ridge (western Sussex and northern Warren counties) in 1981. In 1982, the trap line was extended to include the Bearfort Mountains (eastern Sussex and western Passaic counties).

A barrel trap is a large barrel outfitted with bait. When the bear steps into the barrel and pulls on the bait, a heavy door closes behind it.



PHOTOGRAPHS PROVIDED BY THE DIVISION OF FISH, GAME & WILDLIFE

The Aldrich leg snare is composed of thick airline cable attached to a stout tree and outfitted with a heavy trigger mechanism. The bear steps into a loop over the trigger and the snare is thrown up around its front wrist. Once captured, it can rotate 360 degrees around the tree, which has been cleared of heavy brush to prevent the bear from entangling itself and possibly injuring its legs.

Each day, all sets are checked and rebaited. If a bear is captured, it is approached quietly and its weight is estimated. A tranquilizing "stick" is prepared according to this estimated weight. The stick is actually an eight-foot long aluminum pole mounted with a drug cylinder and needle. The bear is injected with the tranquilizer via the pole, in the lower thigh or shoulder area.

#### Radio-Collars

Once tranquilized, the bear is measured, weighed, ear-tagged and tattooed for future identification. All females are fitted with radio-collars, which are tied around the neck with cotton mason line that deteriorates in 1-1.5 years. Some males are also radio-collared each year. After all the data is collected, the bear is then given an antidote which revives it in 5-20 minutes.

Since 1981, 81 black bear have been captured and tagged on the trap line. Another 17 were tagged as newborn cubs in the den. Some

bears have been captured more than once, the record holder was a two-year old male black bear who was captured five times in a snare!

New Jersey has its share of large bears. At least a dozen of the captured males have weighed over 400 pounds. The largest bear captured to date, a seven-year old male, weighed 550 pounds, was 6'9" long from his nose to his tail and had a 5' chest girth. He was captured in Vernon Township, Sussex County, in 1984.

The combination of tagging and radio-collaring began producing answers to many questions about the "new" black bear population.

Of a total of 81 black bear captured on the trap line from 1981-1987, seven (8.6%) were originally tagged in Pennsylvania. Additionally, of 40 dead black bear recorded in New Jersey since 1980, seven (17.5%) were originally tagged in Pennsylvania. Also, 22.5% of all bears captured on the trap line have been known to cross into Pennsylvania after being tagged in New Jersey, which indicates that they may have originated in Pennsylvania.

As described in the first article of this series, male black bear have larger home ranges than females and are not usually tolerated in their mother's home range once she drives them away at 1½ years of age, and dominant older males will not tolerate them in the area during the breeding season. As a result, the biggest

*Author preparing proper tranquilizing dose.*

*Rigging an Aldrich leg snare.*



**Patty McConnell**, a biologist with the Division of Fish, Game & Wildlife, is Project Leader of the Black Bear Project.

percentage of the bears captured in New Jersey have been 1.5-3.5 year old males which most probably came from Pennsylvania.

Male black bear show a variety of movement patterns in New Jersey. The sighting records and capture tagging and telemetry work have identified two main population centers; the Kittatinny ridge (western Sussex and northwestern Warren counties) and the Bearfort Mountains (eastern Sussex, western Passaic and Northern Morris counties). Many of the males living in the Kittatinny ridge, travel back and forth into the Poconos, particularly within Pike and Monroe counties. The females living in this ridge appear to live here exclusively and have not been known to move far from this area.

Males in the Bearfort Mountains use New York State as part of their range, especially Orange County. Unlike the females on the Kittatinny ridge, females in the Bearforts also range into New York State. The movement is most likely due to the lack of a physical border in this area, as the Delaware River is to the Kittatinny ridge.

The strongest numbers appear to be in the Bearfort mountain area at present. The high quality habitat in the form of well mixed hardwoods and softwoods interspersed with extensive impenetrable wetlands is more abundant in that area than in the Kittatinny ridge. In 1987, 20 captures of 15 animals were made in this area and 13 bears were radio-collared.

These animals are giving new information on movement within northern Morris and western Passaic counties, two counties which are developing rapidly.

Outside of these two main population areas, black bear have been reported occasionally in every northern county except Hudson. No verified sightings of black bear had been received south of Mercer County until 1987 when a black bear was sighted in Ocean County. Many of the sightings in counties such as Somerset and Middlesex are most likely bears that come in from more suitable areas temporarily during the breeding season.

Radio-collar tracking has also given biologists the chance to evaluate the bears' preferred habitat. This past winter 22 black bears were monitored with telemetry equipment.

#### **Estimated Bear Population**

Wetlands are the areas most frequented by the radio-collared black bears, particularly thick impenetrable thickets of rhododendron, mountain laurel and hemlock. Wetlands also provide the earliest foods in the spring. These areas must be protected from development and other forms of human encroachment if the black bear is to continue to thrive in New Jersey.

New Jersey's bear population is now estimated at 125-150 bears that are considered residential animals, even though some share range with either New York or Pennsylvania. During the spring, this number is inflated by some animals moving in temporarily to compete during the breeding season or in the fall if a rich source of food such as dropped corn along the Delaware is available.

Although the habitat could support more black bear, a population at a significantly higher level may cause too much conflict with humans. Black bear numbers in many areas are more limited by a human tolerance factor than habitat.

What does the future hold for the black bear in New Jersey? What are the factors that will determine its ability to continue its promising comeback? We'll explore the issues affecting its future and management strategies to ensure its survival in a forthcoming issue.

Seeing a black bear in the wild is an exciting experience—one that should be enjoyed. If you are fortunate to see a black bear in New Jersey, it should be reported to the Division's research project at:

Division of Fish, Game & Wildlife  
Northern District Office  
RD 1, Box 383  
Rte. 173 West  
Hampton, N.J. 08827  
(201) 735-7040



*Barrel trap.*



# The Morris Canal and Its People

BY JIM LEE AND JOE HANNAN

New Jersey's Morris Canal was one of the engineering marvels of the 19th century. No other canal in history climbed so steep a path in so short a distance as did the Morris on its way across northern New Jersey. Leaving Phillipsburg on the Delaware River with a load of coal, a canalboat had to climb 760 feet to reach the summit level at Lake Hopatcong and then be lowered 914 feet to its intersection with the Hudson River at Jersey City.

Attaining this remarkable elevation with a traditional lock system was impractical. To move a boat up and down 1674 feet would require as many as 160 to 170 locks in just over 100 miles. Waiting for them to fill and empty would have been an economically disastrous waste of time.

The inclined plane, a principle as old as the pyramids, was selected as the method to be used in overcoming the elevation problem. As early as 1796 Robert Fulton, of steamboat fame, had designed inclined planes for moving canalboats up and down steep terrain. It was to this ancient but modernized idea that Professor James Renwick of Columbia University and Mr. Ephraim Beach, famous canal engineer, turned when they were retained by the Morris Canal and Banking Company commissioners to survey a route and to design and build the engineering devices necessary to overcome the obstacles they expected to encounter.

The story of how the Morris Canal was built and operated is fascinating. It has been told over and over in various publications, photographs, motion pictures and paintings as interest in it seems to be an ever growing phenomenon. In this article we could again detail the workings of the reaction turbine or the problems of making a canal climb mountains. Instead we chose to talk about the people: the canal builders, the mule hands, the lock and plane tenders, the boat captains and their families. Where possible we will use their own words.

## The Survey

The route envisioned by George McCulloch when he first conceived the idea of a canal to connect the anthracite fields of Pennsylvania to the iron furnaces of New Jersey and the markets of New York City presented no particular problems. His estimate of the elevations to be overcome were a mere 185 feet above Newark and 115 feet above the Delaware. After all, the Erie Canal had no trouble overcoming 700 feet. Professor Renwick's findings were less optimistic. His rough survey showed 454 feet from mean tide at Newark to the summit at Lake Hopatcong. Not too great a climb; still 146 feet lower than the Erie. The final figures were calamitous; 760

feet up from the Delaware and 914 down to the Hudson.

As we try to drive the route today we find it hard to visualize how difficult it must have been to strike a line over rough, sparsely populated country. Because of the iron furnaces' insatiable appetite for charcoal there may not have been many trees. But the terrain was mountainous and the going difficult. Bad things happened, some of which we can only imagine.

In his film *Famous Tiller Sharks* Jim Lee is interviewing an old friend: canal man Tom Roe. They are walking in a cemetery.

TOM: "Here's the stone we are looking for right here."

'John M. Roof. Born in Canajoharie N.Y. Nov. 24th 1805. Was acting as assistant to the engineer in exploring the route for the Morris Canal and died at Hackettstown, Sep. 17th 1823.'

"He was just 17 years old Jim. Young fella."

JIM: "He died two years before the canal was started even. And he died a long way from home Tom."

TOM: "I wish I knew more about him. Somebody had to bury him, somebody had to pay for the expense."

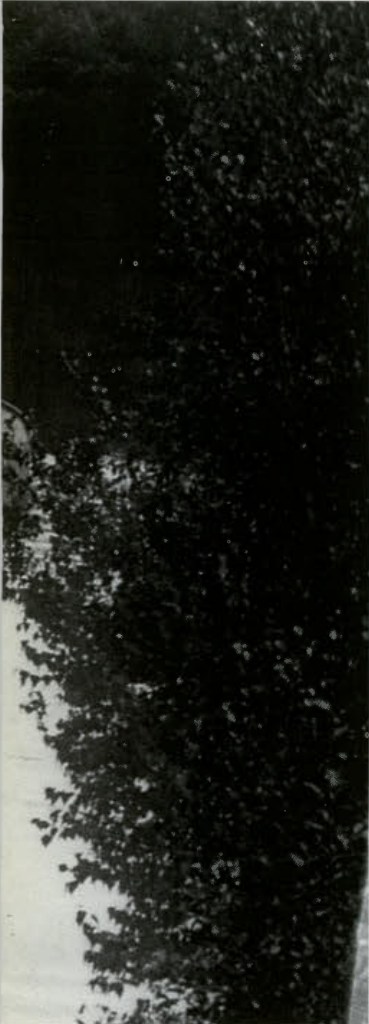
Two years after this interview Tom Roe himself died. He never got to know more about 17-year-old John M. Roof nor did we. Roof's sandstone tombstone, fast deteriorating after more than a century of exposure, has been moved to the museum of the Canal Society of New Jersey in Waterloo Village and a granite marker has been placed on his grave. Perhaps, by now, Tom Roe does know a little more about young Mr. Roof.

## The Digging

Hand labor built the Morris Canal. Twenty or thirty different contractors were hired, each building a different section and each recruiting his own workers. Many came directly from work on the Erie Canal and were usually recent immigrants from Germany, England, Wales, Scotland and Ireland.

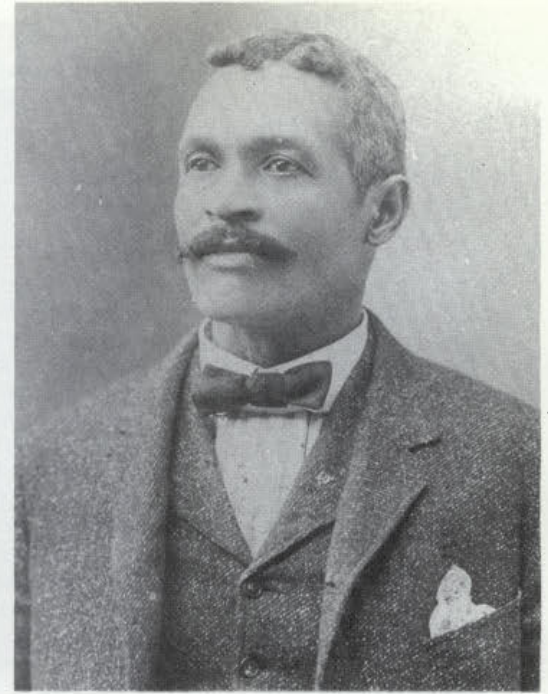
Back then New Jersey was facing a labor shortage. The jobs were low paying, hard and frequently dangerous. Hand-digging was the method of construction, with an occasional pause for blasting intervening rock. Short fuses and unstable black powder left many dead or maimed. But, the real killer was cholera.

Some horses and mules were used. Probably leased from local farmers, they were available only when not needed to make a crop. It was the six-day week of the hard-working, hard-drinking men that completed the



Canal boat on the Morris Canal at the turn of the century.

Dick Titus, age 99, standing at the exit of the tailrace (where water from the turbine exited into the lower level of the Morris Canal).



*Dick Titus and Jim Lee  
in Jim's home.*

*Captain James E.  
Campbell*

through route to Newark in the unbelievably short time of six years.

#### **The Planes**

There were 23 inclined planes, along the route of the Morris Canal. What were the thoughts of the canalboat captain as he directed his vessel into a plane car and made it fast? Was he concerned about his safety? Did he make his wife and children walk up or down a plane rather than lose them to a broken rope or chain? Probably not. As we give little thought to the George Washington Bridge falling out from under us, so the canal people, in time, probably took their ascents and descents as a routine part of life on a canalboat.

At first chain was used to raise and lower the plane cars. Rope too was tried but, in the days before John Roebling perfected his wire rope, accidents were quite common.

#### **The Locks**

For elevations of 20 feet or less locks were used. There were 23 of them to raise and lower the boats as they made their way across the state.

Others, called guard locks, were for another purpose. At some points the canalboats had to enter a river and be towed across. However, rivers rise and fall with the seasons while the canal water level had to remain constant. The guard locks protected the canal from these seasonal variations. At its eastern terminus the Morris Canal had another problem. In 1831 it ended its journey at the Passaic River in Newark. By 1836 the canal had been extended to the Hudson at Jersey City. Here tide locks had to be built to protect the canal from the daily ebb and flow effect of the ocean in Upper New York Bay.

#### **Aqueducts**

The Morris Canal had to cross streams and rivers and millraces and that required aqueducts. The aqueduct was a water-filled bridge carrying the canal and the towpath over streams. The highest of these was across the Passaic River at Little Falls.

A magnificent stone structure, at one time it was the highest stone arch in America. The longest aqueduct crossed the Pompton River between Lincoln Park and Wayne.

#### **The Great Flood of 1903**

The water from Lake Hopatcong proved insufficient to carry boats all the way to Jersey City. To supplement this flow a feeder canal from Pompton Lakes to Wayne was completed some years after the main line opened. The Pompton Feeder was navigable and was used to service the Ludlum Steel works situated at the base of the Pompton Falls.

One night, during the mighty rains of October 1903, Captain Bill "Buttermilk" Cook and his mule hand, Dick Titus, had tied up just downstream from the Ramapo River dam at Pompton Falls. On November 17, 1987, one of the authors had the privilege of recording the following description of that night as given by Dick Titus, age 99:

"We went up to Pompton Lakes to the steel works . . . . When we got there it was raining and we put the team away in the stable and we went down and we et our supper. Everything was all right and we went to bed. One o'clock the steel works blowed the whistle for everybody to get out . . . We got our team out and we went up on the hill and got feed for them. About half-past-one the dam busted and away went the bridge, our boat and everything. We was up there four days and when we come away the mules was in water up to their belly."

The flood was the worst on record. Captain Cook and Dick never saw their boat again.

Young Dick Titus soon had a boat of his own and captained it until he left the canal at age 17. Today he lives in Nutley and keeps the Morris Canal alive for us all with his fabulous memory.

### Women on the Canal

Work on the Morris Canal was seasonal. Late autumn with its falling temperatures brought poor footing for the mules and the fear of a hard freeze trapping your boat for the winter. It also meant unemployment. Everyone was paid per diem and the last pay day the canal was open was the last day of the boating season. Each family member found work as soon as he or she was big enough. Schooling was always secondary to feeding the family.

Many of the locktenders were women for that job carried an important benefit: You lived next door to your work in a house the Canal Company permitted you to occupy rent-free. Year-round this arrangement was most welcome when the only winter work your husband could find was ice cutting.

Mule hands were not always boys. Here are the words of Isabelle Lenstrohm Mann, daughter and granddaughter of canalboat captains, as recorded in 1976 when she was 78 years of age.

JIM: "What was your connection with the Morris Canal?"

MRS. M: "I was born and raised on the canal."

JIM: "When you say born, do you mean actually born on a Morris Canal boat?"

MRS. M: "Oh, yes. I was born between Washington and Port Colden on a Morris Canal boat."

(Later in the interview)

JIM: "When you had to drive mules, how do you drive a mule?"

MRS. M: "Well, just walk behind them and guide them, talk to them, and when we would get to a spot where they had to pull hard, then we'd get up and get ahold of them in front where the bit is and lead them."

JIM: "Were they generally pretty gentle?"

MRS. M: "Yes, the mules were more gentle than the horses."

JIM: "If you weren't there to guide them, what would they do?"

MRS. M: "Well, they would stop and eat. If they seen something they wanted to eat, they'd stop and eat."

### Black People on the Canal

James E. Campbell (Camel) was one of several black men who captained boats on the Morris Canal. This interview was made in

1975 with Florence Van Horn, daughter of Captain Campbell when she was 85 years old.

JIM: "What was your connection with the Morris Canal?"

MRS. V: "Well, I liked to be on the boat and I liked to go from one end of the canal to the other; from Phillipsburg to Jersey City Basin."

JIM: "And your father was a captain?"

MRS. V: "Yes."

JIM: "And you boated along with him? How old were you?"

MRS. M: "About 12."

JIM: "... What did you have to do?"

MRS. V: "I used to wash the dishes and cook. You had a little stove in the cabin and it had a big furnace (Ed. A round cook stove set in a box of sand) near the hinges of the boat."

(Later in the interview)

JIM: "Now how many black people were on the canal that you know? Quite a few in this area?"

MRS. V: "There was quite a few but I can't remember their names. Mary Taylor and Joe Taylor, they lived here. And Mr. Haines lived here."

(Later in the interview)


JIM: "Did everyone get along good on the canal? The white captains and the black captains?"

MRS. V: "As far as I know they did. There was never no trouble."

JIM: "There was never no trouble?"

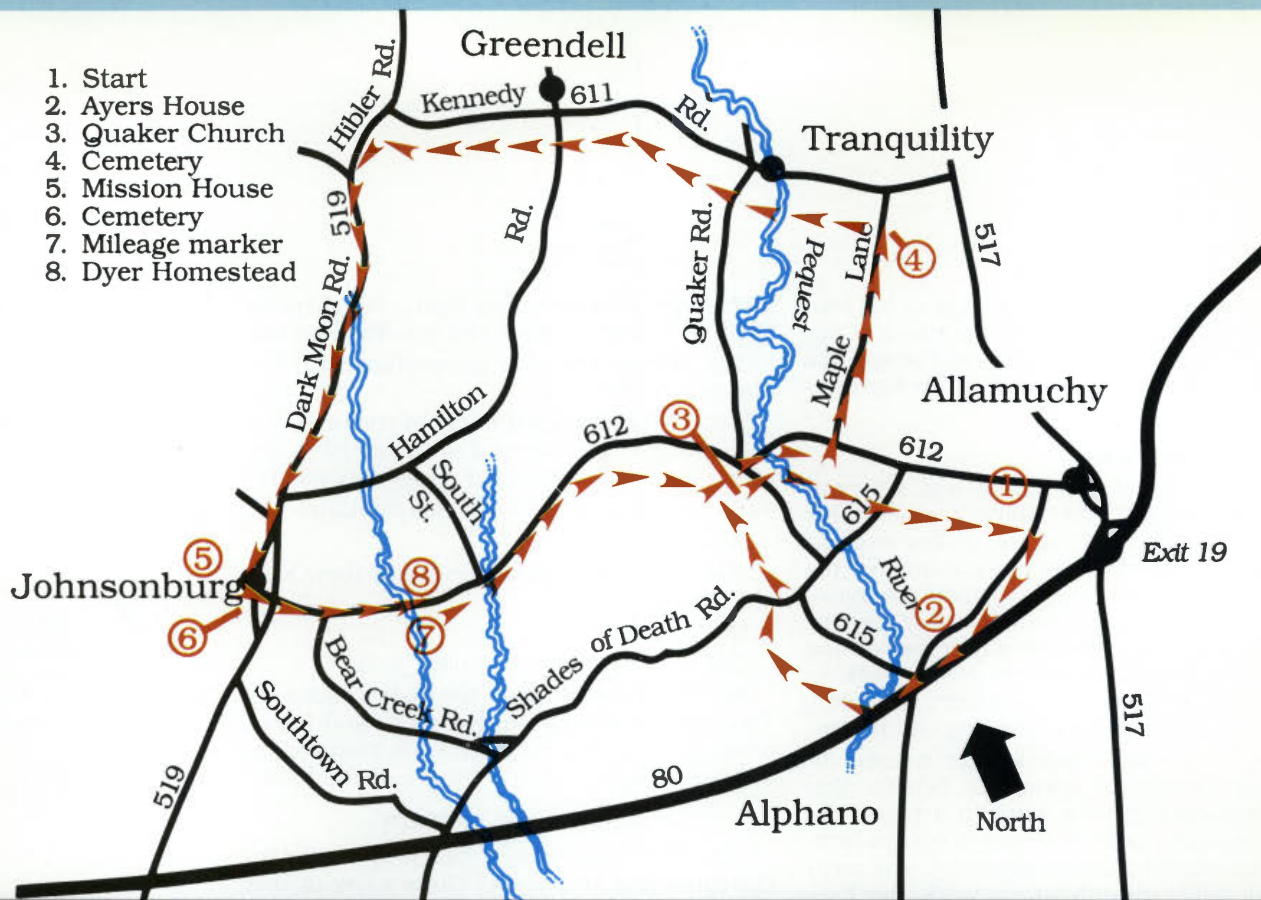
MRS. V: "No, 'cause when a mule or a horse would die there on one of the boatmens, why, then the other boatmens would try to get together and get him a substitute right away and try to help him ... They were poor people that had the boats, but they were good to one another."

### Gone Forever

On November 29, 1922, the Morris Canal passed into the possession of the State of New Jersey. Only property in Phillipsburg and Jersey City plus land at Lake Hopatcong, Lake Musconetcong, Cranberry Lake, Bear Pond, Saxon Falls and Greenwood Lake were retained for public use. Despite efforts to preserve it as a linear park, destruction was begun immediately. Its structures have been razed and the canal bed itself has all but disappeared under highways and parking lots. Only the efforts of a few individuals and organizations have preserved the artifacts and memories of one of the greatest engineering accomplishments of the 19th century: THE CANAL THAT CLIMBED OVER MOUNTAINS. 

New Jersey's Morris Canal has held a fascination for **Jim Lee** for over forty years. As a boy, he rafted in the basin of the canal at Port Delaware. He has published several books on the canal: *Tales the Boatman Told*, and two editions of *The Morris Canal: A Photographic History*.

**Joe Hannan**, co-author of the Morris Canal article, has authored two books, *Never Tease a Dinosaur* and *Killing Time*, published by Holt, Reinhart & Winston, and has been published in many newspapers and magazines over the past 10 years.



1. Start
2. Ayers House
3. Quaker Church
4. Cemetery
5. Mission House
6. Cemetery
7. Mileage marker
8. Dyer Homestead

The inevitable has happened. A New York City firm offering bicycle tours has discovered the Pequest Valley in Warren and Sussex counties. To their excursions in England, France, and China they've added a day-trip through the Allamuchy-Tranquility countryside.

I've been cycling in this area for years, and before this tour brings the crowds you too should try it. The countryside is quiet and beautiful no matter what the season. The route is dotted with homes, cemeteries, and villages that, with little imaginative effort, will take you back to the rural New Jersey of a century ago.

A good place to start is the Allamuchy School parking lot, unused during the summer and on weekends. Almost immediately after leaving the parking lot turn left (south) following the sign to Alphano. You'll know you're pedalling in the right direction when you pass red barns and a farmhouse on the left side of the road. About one-half mile on the right is the Ayers house, a stone and frame farmhouse built sometime prior to 1800. It is still occupied and the land around it still farmed. Go about another mile and turn right on Route 615.

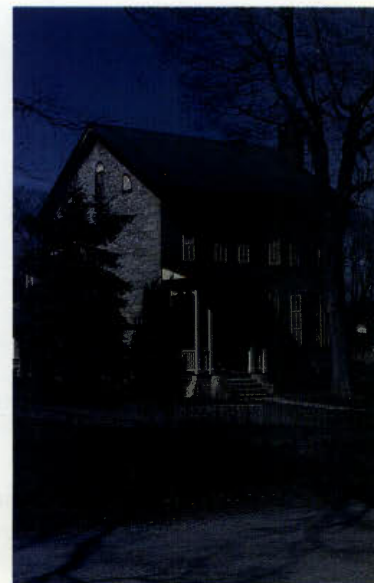
You'll cross the Pequest River here for the first time. Downriver from here the Pequest goes through the Great Meadows and drains it, making the area viable agriculturally. Periodically, the river is dredged (by the State of New Jersey) and cleared of obstructions and is great for canoeing. Follow 615 for about a mile to a T-intersection, bear right, go to the

next left and take it to the next intersection. Turn right. This area is called Quaker Church. A Quaker meeting house was built here in 1752. The meeting house is gone but the burial ground remains. It is maintained by the Allamuchy Historical Society.

As you continue, you'll again cross the Pequest, pass the lovely Gibbs Farm and then make a left onto Maple Lane. This lane, a tunnel between rows of huge maples, ends at Kennedy Road in Tranquility. On the right at this intersection is a cemetery which you should visit. Grave markers are dated to the early 1800s and some of the illegible ones are probably older. Names like Stuyvesant and Rutherford are here, early owners of thousands of acres in the valley. Many of the older houses along the way were tenant houses in the early days. Headstones bear names like Cummins, Gibbs, Slockbower and Hibler, their descendants still living in the area. Here you'll find the grave marker, shaped like a saddle, of George Shaw, a cavalry veteran of the Civil War. He survived imprisonment in three Confederate prison camps including the notorious Andersonville. He returned to this area after the war, married and raised a family, finally dying in 1928 at the age of 86. The shade and solitude of this place make it a perfect rest stop.

When you leave here turn left on Kennedy Road or Route 611 and go to the village of Tranquility. On the banks of the placid Pequest, the post office-general store are "downtown". Cross the river and continue on to Greendell, another general store village. Don't

MAP AND PHOTOS BY AUTHOR.



# Cycling in the Pequest Valley

BY FRANK T. DALE



turn right at Greendell but continue straight to Hibler Road. Turn left on Hibler and it soon becomes Route 519. Follow 519 south into Johnsonburg. Locally, this stretch of road is known as Dark Moon Road. There used to be a Dark Moon Tavern here near the cemetery but it is gone now. Whether the road was named for the tavern or vice versa I can't say. At the stop sign at Johnsonburg go straight ahead. Somebody decided this big city needed a bypass, but if you take it you'll miss Johnsonburg and that would be a shame.

Except for the automobiles this village seems like something out of the past, which, in fact, it is. Most of the homes are quite old, some pre-Revolutionary. For example, in town on the right is the Mission House, a stone edifice built between 1731 and 1781. It is the oldest surviving structure for religious purposes in the county, although now it is a private residence.

In the center of town, opposite the old hotel, make a left turn on Route 612. You'll see another cemetery on your right, the Johnsonburg Christian Cemetery. It is small and immaculately kept as all these country cemeteries seem to be. Names like Decker, Luse, Westbrook, and Durling are here. There is a grave marker inscribed "The White Pilgrim" who was an itinerant preacher from Ohio. Local tradition says he wore only white clothing and rode a white horse. He was stricken with smallpox and died in Johnsonburg in 1839.

Two miles out of Johnsonburg you'll see a stone marker on the right giving the mileage

back to the town or "Logg Gaol" as it was once called. This marker was installed in 1754.

Just beyond this point is the Clark farm. It was originally the Dyer Homestead, and the small stone house on the left was built during the Revolutionary War. Some of the outbuildings are almost as old. The house and barns are still in use at this prosperous looking farm.

From here it is but a short distance back to the starting point at Allamuchy School. The trip as outlined is 16 miles in length. By utilizing the map you can find routes that will increase the mileage or decrease it, as you see fit.


The trip can be taken at almost any time of the year except in the winter when cold winds blow in across the meadows. The land is primarily agricultural and the fields under spring plowing or with green corn higher than your head make a perfect ambience for the trip. My favorite time of the year is the fall when the corn stands in the fields, dry and brown, and the mountains and woodlots are their brightest colors.

The roads are two-lane secondary roads but the cyclist will meet few cars. For some reason there is less traffic on weekends than during the week.

There are several excellent books about the history of this area and the homes mentioned.

They are:

*Tales and Towns of Northern New Jersey*, by Henry C. Beck, and

*Early Architecture of Warren County* by Dennis H. Bertrand. 

**Frank Dale**, a frequent contributor from Allamuchy, said, "I'm old enough to remember when the Shad *didn't* come up the Delaware, old enough to remember when there were no full time Canada geese, no wild turkeys, no black bear in the state. In short, I remember the bad old days, environmentally. Hence, my present enthusiasm."



# Get Set for Fluke

By RUSS WILSON

New Jersey offers some of the finest summer flounder fishing to be found in the northeast. Here's how, when & where to catch your share.

May is traditionally the month that heralds the start of the fluke (summer flounder) season for New Jersey's saltwater sportsmen. Most years, the summer flatfish move into the coastal estuaries and inshore shallows by mid month or at the very latest, the week prior to Memorial Day.

There is no pre-warning as to when fluke will arrive in the shallows. One day the ocean is seemingly devoid of the tasty summer flatfish, and the next day fisherman from Sandy Hook to Cape May are reporting good catches.

Studies undertaken among fisheries biologists indicate rising water temperatures trigger the inshore migration. As ocean waters climb above 50 degrees, summer flounder become active and the migration into coastal estuaries and inshore waters will get underway.

It is possible to catch summer flounder when ocean water temperatures are in the low 50 degree range; however, to enjoy optimum fishing opportunity, it pays to seek out areas where the waters are slightly warmer.

Many biologists feel the summer flounder have a preference for water temperatures of at least 60 degrees and above. Other marine fisheries experts who have studied the summer flounder say the flatfish will continue to feed when ocean waters are cooler, provided it is during a period when water temperatures are dropping, a situation fishermen normally encounter during the months of September and October.

The New Jersey state record fluke, a huge "doormat" weighing 19 pounds 12 ounces, was caught off Cape May, way back in 1953 by Walter B. Lubin.

The average size fluke taken from inshore waters is much smaller, with most early season flatfish averaging less than two pounds. In fact, many of the early season fluke will weigh a pound or less and measure only 10 to 13 inches.

The smaller fish must be returned to the water unharmed. The current minimum size regulation for taking fluke from all New Jersey waters is 13 inches.

Many experienced anglers have a self imposed minimum of 14 inches, feeling any fish measuring less than 14 inches is too small to fillet.

The fact that many fish weigh only a pound or two does not mean there are no large fluke available. Quite the contrary. Each season "doormat" size fluke weighing in excess of 14 pounds are reported, and fish of 5 to 7 or 8 pounds are reasonably common. The 1987 fluke season, for example, produced a greater number of 5 to 8 pound flatfish than have been reported since the mid or late 1960s.

There is no doubt the summer flounder is the most popular species among saltwater anglers, annually attracting many thousands of vacationing tourists and Garden State residents to New Jersey Coastal waters.

When the fluke fishing is good, as it has been for the past decade, party, charter and rental boats will be sailing from all major boat basins on a seven days per week schedule.

Many seafood gourmets feel the fluke is one of the finest eating species inhabiting Jersey Coast waters and will carry a cooler half-filled with ice to insure the fish are in pristine condition from the moment they are caught until the boat returns to port where the catch can be cleaned and kept on ice for the trip home.

A lot of saltwater fishermen who specialize in fishing for the summer flatfish will go to extremes when building rods, designing terminal rigs and selecting specific baits.

There is no doubt it pays to study the habits of the fish you hope to catch and to then select the proper approach to insure a good catch. However, under practical fishing situations, it is not really necessary to get so involved that you lose sight of the fact that fishing for fluke, or most any fresh or saltwater fish, is supposed to be a fun kind of recreational sport, while at the same time providing some fresh seafood meals.

Keeping this in mind, select tackle that will allow you to maintain control of the fish while still allowing you to enjoy the fun aspect of the sport.

Fluke specialists who focus attention toward coastal rivers, sounds and bays prefer light-weight equipment that allows them to feel the bottom. The majority of experienced fluke fishermen we've known who do their fishing in the estuary waters knew the limit of their tackle and were capable of handling even the largest fluke they might hook.

A good outfit for fishing the estuaries should start with a quality fiberglass or graphite rod measuring 5½ to 6½ feet that is rated to handle weights of 1 or 2 ounces.

If you elect to use a spinning rod try to purchase reels that are classed as heavy fresh or light saltwater. Most of these models will have a line capacity of at least 200 yards of 10 or 12 pound test line and are more than adequate for fishing coastal estuaries and most inshore waters.

We suggest conventional revolving spool casting reels and mid-weight rods that are designed to be used with the reel mounted above the rod handle, rather than underneath, such as those designed for use with spinning reels.

Knowledgeable fluke anglers accustomed to fishing with revolving spool reels do have an edge. The conventional type equipment af-



fords a more controlled presentation of baits and at the same time allows the angler to "feel" exactly what is happening at the business end of his line.

Conventional casting tackle is a little harder to master than spinning or spin casting, but because the line is held between the thumb and forefinger during the retrieve and when drift fishing, hits are easier to detect.

When probing ocean and bay areas, where water depths of 20 to 60 feet are common, most experienced anglers will opt for slightly heavier tackle.

When fishing ocean waters there are many variables that must be taken into consideration, some of which do not apply when fishing coastal estuaries.

Deep water fluke fishing will generally require a heavier sinker to carry the baits down to fish eye level. Occasionally, tidal movement or drift speed caused by wind are additional

factors to consider, and there is always the possibility of hooking larger fluke when probing deep water structures such as wrecks, reefs and rock infested areas.

A favorite fluke outfit, one that we've used for the past ten years, consists of a 6½ foot plugcasting rod and a mid-size revolving spool casting reel. For most inshore fishing we'll load the reel with a premium grade of 12 or 14 pound test Dacron or monofilament line.

Most any quality rod, either fiberglass, graphite or fiberglass-graphite composite construction will do just fine. If possible, purchase rods manufactured by reliable companies.

Savvy fishermen normally have two fully rigged outfits whenever fishing specifically for fluke, and will normally use both when drifting inshore waters.

The benefits of having and using two outfits are rather obvious. The chances of catching fish are increased, since the angler always

*Youngster with fluke.*

PHOTOS BY AUTHOR



has two baits in the water. And, since summer flounder are a schooling fish, when the boat drifts over a spot that harbors many fish, each bait is likely to be grabbed.

Fluke are very aggressive and will eat most anything they can fit into their mouth. It pays to carry a variety of different baits, for you never know exactly what will "turn the fish on" from one day to the next or even from one tide to another.

Strips of squid, live killies, fresh or frozen sand eel, spearing and smelt are among the more popular offerings and can usually be purchased from most any bait and tackle shops in the coastal area. Other productive baits include strips of fresh fluke belly or back, strips cut from the belly or side of fresh caught sea robins, herring, mackerel and other small fish.

Experienced fishermen find it also pays to offer the flatfish a combination of two different baits. A favorite among New Jersey sportsmen is the squid strip and killie. Other offerings that can be equally effective include sand eel and squid or spearing and squid.

There are hundreds of bait rigs currently being sold throughout New Jersey. Most will catch fluke. I suggest you stop at one of the shore area bait and tackle shops and look over their selection of fluke rigs.

I prefer rigs that are tied with a long leader and will usually make up several dozen during the winter season. A leader, 20 or 30 pound test monofilament material is a good choice, of at least three feet is recommended for most inshore, river and bay fishing.

Many experienced fishermen prefer a short shank style hook when seeking fluke, and will normally use an upturned eye model in sizes 1 through 2/0 in silver or gold finish.

Fluke rigs are quite easy to make. To tie the basic fluke rig begin by snelling the hook directly to one end of the leader. Once this step is complete, the opposite end of the leader is attached, using a clinch knot, to one eye of a three way swivel.

Sinkers are attached to the three way by using a regular connecting link. These are available at most tackle shops and are very inexpensive. The remaining eye of the three way is used to attach the fishing line.

Fluke do not strike a bait in the same manner shown by other saltwater species. A hungry fluke will normally grab the bait and hold it in his mouth until he is ready to swallow it. All you will feel is additional weight on the line, much like when you've hung the sinker on bottom or picked up some seaweed or other trash.

This is the moment of truth, and it's what separates the novice from the expert. New-

comers to fishing for fluke will rear back on the rod and hope the fish is hooked. The expert, on the other hand, has been there before and knows enough to give the fish a few seconds to munch on the bait before striking.

It is that moment of hesitation that allows the fish to swallow the bait and it is a technique that must be mastered by anyone who hopes to become a success at catching fluke.

When it comes to fishing, nothing is etched in stone. Savvy fishermen do whatever is necessary to make the fish bite.

Some days the summer flatfish will jump all over a bait, and it is possible to set the hook the minute a hit registers up the line. At other times and under different conditions, a short drop back is necessary to give the fish a chance to taste his meal, and on some occasions you'll find it pays to make the fluke follow the bait by pulling it ahead so it appears to be escaping, rather than using the drop back method.

Experience is the key to success. No one learns it all on his or her first trip. As with everything in life, only those who are willing to invest time and effort are going to reap the rewards.

Excellent fishing opportunity exists from one end of the Jersey shore to the other and in all coastal estuaries from upper Delaware Bay to the Staten Island shore at Raritan Bay.

If 1988 follows tradition, the fluke will move into the coastal inshore waters, filter out along the coast and then settle onto inshore structure or move into the rivers and bays to provide non-stop fishing action until water temperatures begin to slump late in September or October.

There is no doubt Sandy Hook/Raritan Bay is the state's premier fluke fishing area.

Each summer many thousands of legal size fish are taken from the bay and the rivers that flow into the lower bay at Sea Bright and Rumson by anglers fishing aboard party and charterboats sailing from the municipal basin at Perth Amboy, Leonardo, Atlantic Highlands and Highlands.

Shark River, Manasquan River, Barnegat Bay, Great Bay, Delaware Bay and most every river and sound from Barnegat Inlet south to Cape May will provide some decent catches also. And, if that isn't enough to get attention, there is more than 130 miles of coastal area that should provide equally rewarding fluke fishing throughout the summer and fall seasons.

The fluke will be here this month; get set now and you too can be one of the 10 percent of saltwater anglers who catch 90 percent of the fish. **NJ**

**Russ Wilson**, a frequent contributor and former editor of *The Fisherman* magazine, is a fishing boat captain and a sportsman who has hunted and fished our state for the past 40 years.





**Jan McDowell**, a frequent contributor and columnist for the *New Jersey Herald*, recently returned from an African bow-hunting seminar in which she and her husband demonstrated how to hunt game with a compound bow.

possibilities connected with them. They ask about wages, education needed and the possibilities for advancement in the positions they encounter.

Kylish concentrates mostly on the management of deer, pheasants, rabbits, turkeys, trout and black bears, with emphasis on population dynamics, the importance of good habitat, the role of hunting and fishing in the management scheme, put-and-take wildlife and some anadromous species of fish and migratory game birds.

During the ice-bound cold of winter this year, the class, in studying the uses of the state's abundant wildlife resources, held a wild game feast at the school. Some 50 people, mostly the faculty and administration of the school, enjoyed venison, Canada goose, pheasant, elk and pronghorn antelope in the home economics room during regular lunch periods one day.

The students has had their own feast the day before, just after the dishes had been prepared, saving most of the spaces at the dinner for others.

"The main purpose of the dinner is to show the kids that there can be more to wild food than steaks," said Dave Pede, chairman of the Agriculture Department, "and to introduce wild foods to people who don't normally have the chance to try them."

The boys did the early preparation of the meats, like butchering and arranging for specialty meats at a butcher store. The girls, assisted by additional girls from horticulture classes in the agriculture department, did the cooking, under the guidance of Joan Pruess, chairman of the Home Economics Department.

To be eligible for the wildlife course, students interested in finding out about careers in the out-of-doors must take the basic course, called Introduc-

tion to Natural Resource Occupations, which is taught by Mike Ridge. The 28 freshmen and sophomores in this group meet one hour a day, mostly in the school, to learn what it's like to work in the fields of forestry, wildlife management, soil conservation, parks and recreation. Occupations from those obtainable right out of high school through those requiring advanced degrees are investigated.

As in the other classes, Ridge uses a lot of videos, guest speakers and hands-on activity to achieve the goals of the course.

"We offer a break that some kids need in the middle of the day," Pede said. "They can release their pent-up energy and do Occupations from those obtainable right out of high school through those requiring advanced degrees are investigated.

This, says Pede, makes some students see the need to continue with their educational training when they had not previously seen any reason.

The final of the three courses, called Forestry and Rural Outdoor Recreation, is for upper classmen. Pede, who teaches this class, alternates the emphasis of the two-period, five-days-a-week class each year—from forestry to recreation and back—which allows students to take it two years and get credit for it twice.

This year, in preparing for the possibility of a career in recreation, the group of 15 juniors and seniors have learned to shoot and tune compound bows, shoot and take care of shotguns and use and take care of fishing equipment, in addition to learning how to tie their own flies—skills that could make the students eligible to work in sporting goods stores or related fields. Of course they spend some time trying out these skills on the waters of the state because you can't sell sporting goods

unless you know the skills associated with the sport.

When forestry is the subject of the class, students do timber stand improvement projects on woodlots—they use chain saws to clear unwanted trees to allow harvestable timber to grow unimpeded—study silviculture (tree identification), use increment borers to determine ages of trees and Biltmore sticks to determine the log length of standing trees and study forest succession while visiting diverse forests in the area.

Soil and water conservation, Christmas tree farms, tree nutrition, fruit tree grafting, tree diseases and effects of pests, like the gypsy moth, are studied.

"We want to make them knowledgeable enough about the environment so they can make intelligent decisions about it in the future," Pede said. "If they have to vote on an environmental issue, they'll be able to do it intelligently."

The groups have visited the Department of Environmental Protection's Division of Fish, Game and Wildlife's Pequest Trout Hatchery, the Rockport Game Farm, local wildlife management areas, Van Campens Brook, (one of the state's few streams where trout reproduce naturally), state parks and forests and the Delaware Water Gap National Recreation Area.

They have done forestry cleanup and wildlife habitat improvement projects at the local Fairview Lakes YMCA camp in exchange for the use of the camp's facilities and canoes.

After taking each of the four different classes offered, all for science credit, seniors at Newton High School may decide not to enter the natural resources field. But the decision is made intelligently, with a knowledge of "what's out there." But, the outdoor knowledge they've gained can be used to make living easier in a rural area or for personal recreation throughout their lives.

Despite a lowering of enrollment in the school and a shift away from agriculture in the area, the number of students interested in the program has steadily grown over the years, according to Pede. Although most of the students are boys, the classes welcome girls, several of whom are enrolled. **NJO**

BY CAROLYN DEVRIES

## A Teacher's Field Trip Tips

It's time to plan another class day field trip for your students. Thinking back, you remember such past activities as plays, concerts, and museum tours. You really would like to try an environmental education outing, but you are hesitant because you feel you lack knowledge and experience in this area.

Don't hesitate! All you as a teacher need is what your students are sure to have already—a sense of adventure, an enthusiastic attitude, and a desire to enjoy more of our state's many outdoor resources.

Perhaps the following suggestions will spark some ideas and aid you in your planning. So don those jeans and sneakers and prepare for a shared time of fun as well as learning.

Most environmental and nature centers offer multi-seasonal programs and lesson choices for all school ages. Call or write to a place of interest for literature describing its programs and facilities.

A new book to be published by Rutgers University Press this summer titled, *A Field Guide To New Jersey Nature Centers* by Pat Contreras Held, past director of the Poricy Park Nature Center, promises to fill this niche.

When you have arranged for a visit, you can usually expect a written outline or personal contact to explain the schedule for the day, a description of the planned activities, and, perhaps, suggestions for dress and items to bring. Some centers provide worksheets as a follow-up to the lesson that can be completed at the site or in school. Also, some centers market inexpensive activity booklets that correlate with the material presented. It might be possible to include them in the trip price and arrange for their purchase ahead of time, so that each child has one for classroom use.

Encourage parent and family involvement. Not only does this provide for stronger home-school relationships, but parents can become supporters of and active participants in environmental education programs.

Send letters home prior to each trip detailing the preparations each child

needs to make and describe the day's plans. Perhaps you can include some suggested parent-child pre-trip and post-trip activities—for example, locating the designated place on a map, researching a question or two, or sharing a particular book, even providing parents with suggested questions to ask their children when they return home to encourage discussion. Sometimes it is possible to send home a reprint of a magazine or newspaper article relevant to your chosen trip site.

Provide each family with a pamphlet from a visited place describing public and family programs. If not available, include in your letter the address and phone number of the center with a brief description of its purpose, its hours, and some programs of interest.


Some centers provide in-school programs that correlate with specific field trips or center objectives. A visit from a resource specialist or an audio-visual presentation can be arranged prior to or after a trip or, even, as an independent program.

Consider a Saturday or evening trip designed not just for your students, but for their families as well. Discuss this possibility with the program director who can provide some suggestions and work with you in the planning. An evening campfire with an environmental

music sing-along could be one such experience.

One of the simplest ways to involve parents, of course, is to recruit *several* adult chaperones, so students can benefit from adult interaction and supervision in the "hands-on" activities that are so much a part of environmental education outings. Meet or call parent volunteers prior to each trip in order that the adults understand your expectations and feel comfortable with the day's planned experiences. Allow yourself to mingle with all groups, as well as benefit fully from your center guide's experience and knowledge.

Is there an adult with a VCR or a camera who is willing to record your experiences on tape or slides? The sharing of these materials or one of the resource programs could be the basis of a pleasurable family evening at school, not to mention a source of delight for your class after the trip.

Most importantly, remember that centers can adapt their programs to the unique needs of teachers and their students. Just get out and experience New Jersey's beautiful outdoors! 

**Carolyn DeVries**, a Gloucester Township School System teacher, has taught second and fourth grades at Chews School. She successfully incorporates all of these ideas into her class outings program.



# Natural Resources Education

## Send Us Your Natural Resources Education Lists

### Editor's Comments: Natural Resource Education Programs in Our School Systems.

Because we've been unable to locate a complete listing, or an adequate partial listing that could be used as a baseline of schools, school districts, elementary, intermediate, or high schools participating in environmental education programs, we are compiling a listing of schools, grade levels and courses offered on a statewide basis. This list will not be the last word—just the beginning. Your inputs to us will make our list a valuable source document for our readers, teachers, and others interested in environmental education programs in operation in our state. Those school districts not actively involved can use this information as a blueprint or a guide to initiate an environmental/natural resource education program in their areas.

This article will be reprinted and distributed to all schools in New Jersey by the New Jersey Education Association. This was made possible by Trudi Thornton, NJEA Environmental Education Committee Staff Contact, and we're indebted to her.

Most importantly, we believe that our school children need hands-on learning experiences about how our natural world really works. And, in a small way, we'd like to make it easier for teachers and schools to introduce and teach these concepts.

During the preparation of this article, using some names and telephone numbers provided by other sources, I called some 20 or more schools actively involved in teaching environmental education subjects. Included are some quotes from administrators, teachers and others that reflect the importance of these experiences and enthusiasm of the participants.

From teacher Bill Westphal, Area Supervisor of the Environmental Education Program in the Audubon School District: "The renewed emphasis on environmental education in this district is very timely. We are in the midst of changes to improve our sewage system in this county. We can use our own local water system, Had-don Lake, to show the effects of environmental neglect and the high cost of repairing that neglect."

Steven Foote, Coordinator of the Gloucester Township Public Schools

Conservation Ecological Environmental Education Program (CEEEP), which is a system-wide program, sent us a quote from a parent-chaperone: "This has been my second trip with the CEEEP within 10 months and I have enjoyed this time even more for many reasons. First of all it is essential that this program not only be continued but also be allowed to grow in any and all ways. The program finally has a dedicated, competent, enthusiastic, professional. The obvious planning and ease of implementation of the program demonstrates the overall success of the professional thrust."

The Environmental Education program at Neptune Junior High School is a full-year five-credit elective course offered by the Science Department for 9th grade students. It is offered on a competitive basis to 48 ninth graders. Barbara Pietrucha, Coordinator, said: "The program has been developed to enhance the best traits in each student. A sense of family prevails which motivates group problem solving. The effectiveness of the program is aided by the total support of the school and the Board of Education, the cooperation and assistance of parental involvement and the high interest level of the students. The program aims to expose students to life situations in such a way to develop the students into dynamic well balanced young adults."

*New Jersey Outdoors* has been publishing natural resource education articles almost from the beginning of my editorship in 1974, and the Department of Environmental Protection is committed to a broad spectrum of environmental education programs disseminated by several divisions in DEP.

The Wildlife Workshops for teachers were introduced in 1976 by the Division of Fish, Game and Wildlife, and since that date have enrolled and taught about 2000 teachers and other professionals at the School of Conservation in Stokes State Forest, and the Marine Sciences Consortium at Seaville. These programs are managed by David Chanda, Chief, Information and Education Unit.

Mimi Dunne, biologist and member of the Information and Education Unit in the Division of Fish, Game and Wildlife, is the Project WILD Coordinator for the Department of En-

vironmental Protection. For information on the programs, call 201-637-4125, 609-292-9450.

Marlena Gloff-Straw is the Supervisor of the Environmental Education Unit in the Office of Communications and Public Education. Ms. Gloff-Straw and staff conduct workshops throughout the state on Project WILD, Project Learning Tree and The CLASS Project. They can be reached at 609-292-3200. Ms. Gloff-Straw is also the Editor of the *Explorer* insert.

Ms. Gloff-Straw said, "Although the educational programs offered by the Department of Environmental Protection are varied, they share a common goal—to assist people of all ages in becoming aware and acquiring knowledge about our state's natural resources enabling them to make informed decisions and take responsible action."

Mary Sue Topper is the Public Education Coordinator for DEP's Solid Waste Division. The Education Program for schools includes a full range of Solid Waste Management materials on such topics as RECYCLING, SOURCE REDUCTION, RESOURCE RECOVERY, and LANDFILLS. School resources include *Mr. R. E. Cycle, Peppermint Puppeteers, Allu-Man the Can* (K-3 video), assorted fact sheets and in September, 1988, a supplemental curriculum for grades 4th through 8th. Ms. Topper or Vicki Kerekes can be contacted at 609-292-0115 or 609-292-3274.

Now the message we want to get out to all the school systems in New Jersey: Please send to the address below the status, size, grade levels, curriculum, and other information on the natural resource/environmental education programs in your school or district. Include coordinator of program and telephone numbers.

Your information will be condensed and become part of a list that will be revised periodically and distributed statewide to schools, environmental centers, state government agencies, and other interested parties. Mail to:

(NRE)  
NEW JERSEY OUTDOORS  
CN 402  
TRENTON, NJ 086

# Canoeing on the Maurice

BY WILLIAM A. COUGHLIN

It's "Maurice" not Morris. Notwithstanding its local pronunciation, the Maurice River in Cumberland County is no pussy cat.

Among the white water aficionados, the Maurice River in South Jersey is not generally regarded as a challenging torrent of raging cataracts or dangerous rapids. It is in their words a "sluggish pastoral stream" suited more for aquatic study than white water thrills. When abnormal conditions prevail, however, a rapid change occurs that transforms this sluggish little stream into a surging watery obstacle course worthy of any canoeing challenge.

Its uneventful and belying course is conceived at the quiet little lake in Malaga, where bog iron and rotting vegetation concoct its mahogany complexion. Through the broad wooded flat lands of the coastal plain the little river gathers momentum from a thousand freshets and springs that quickly contribute to its volume and vigor. Most of the water course traverses a swampy woodland of Maple, Gum, Willow and Cedar, trees that normally tolerate occasional flooding and suggest its watery habitat. When the spring floods bring increased freshets, in exponential rills, the wooded banks are transformed into a bayou of swampy hummocks and inundated timber. The great maples that once lined the banks of the river are unable to keep their feet when fresh gales topple them over into the stream. The resultant maze of downed timber creates a jungle of navigational obstacles that con-


verge in a surging flood of entangled trees.

These obstacles to passage take on additional significance when one is confronted with split decisions as to their circumnavigation. So confounded were we that we thought our canoe was a submarine having only the ability to go under each obstructing tree. My son, who co-piloted this expedition, took repeated exceptions to my piloting advice. Where I called for an end run he would counter with a plunge down the middle. The end result being a disastrous compromise that imperiled both our craft and our honor.

What had started out as a quiet canoe trip on a peaceful little river was suddenly a nightmarish excursion through the cedar water hell of the mighty Maurice. Had the river in its pristine innocence presented itself with unabashed gentility, we would have understood its reluctance to abate its unaccustomed capacity to man's insulting abuse. As we approached the end of our ordeal, the river once again offered solace to our strained nerves with swampy vistas and quiet lagoons.

We were grateful for survival and our honor still intact having no loss of paddle or cushion to mar our travail.

It was another encounter with the elements that proved you can't fool Mother Nature even though we call her little river "Morris."

*The mythical "lurid river creature" did appear; in our case we saw him on three occasions, for what else could account for those unexplained immersions into the deep.* 

**William A. Coughlin** is a school teacher and a first time contributor to *New Jersey Outdoors*.



# Hurricane A' Comin'!

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BY SUSAN D. HALSEY, PH.D.

Before World War I, the title above, passed around the community by word of mouth, may have been the only warning many people ever received about the approach of these fierce, dreaded storms. Usually however, there was no warning at all, and hurricanes were responsible for much loss of life and property destruction such as the 1900 hurricane which struck Galveston, Texas and killed 6,000 people. Although the warning systems have improved over the years, there is still much uncertainty and unpredictability about hurricanes which should generate a great deal of respect from residents of a coastal state like New Jersey.

Hurricanes, large well-structured storms, begin as small tropical cyclones, storms with a counterclockwise rotary circulation. Once formed in warm water areas, either off Africa or in the Gulf of Mexico and western Caribbean region, these storms are moved by the weather patterns west or north, respectively. Depending on conditions, these tropical storms can increase in size, speed and intensity, becoming full-fledged hurricanes when winds are over 74 miles an hour.

Until aircraft flew through them and satellites viewed them, we never knew exactly what hurricanes looked like and why they acted the way they do. Beautiful in a deadly way, these spiral storms with various tails and an "eye" (a center area of very low pressure, clear weather and much lower winds) can extend for a radius of 20-30 miles from the eye. To



PHOTOS PROVIDED BY AUTHOR

New Jersey State Library

**Susan D. Halsey**, a marine geologist with DEP's Coastal Resources Division, has written several articles for *New Jersey Outdoors*.

*Photograph of a hurricane. Note hole in the center; the "eye" and "tail" of clouds trailing off the edges.*

be officially termed a hurricane, winds must be at least 74 miles an hour, although near the center of the hurricane these winds can gust to more than 200 mph.

### Hurricane Season

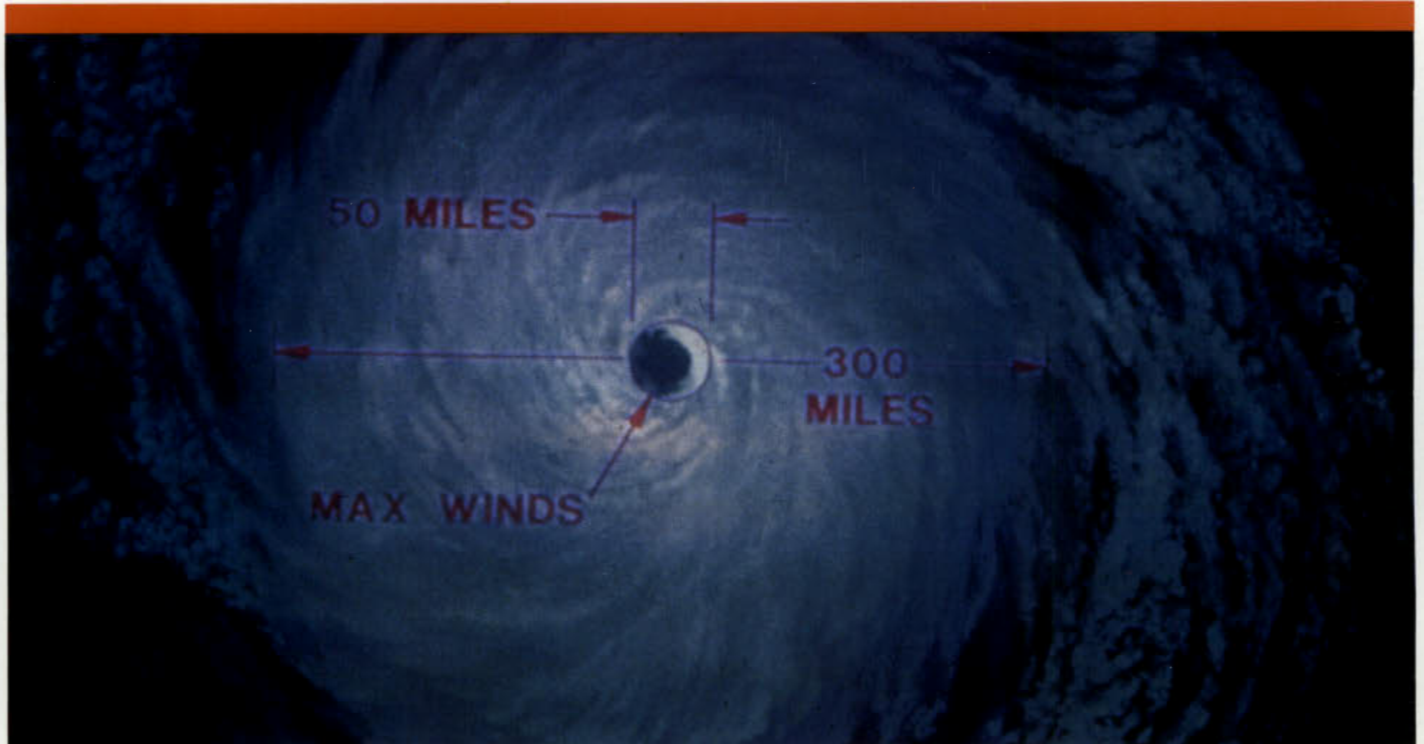
Because hurricanes need warm water to develop, hurricanes normally occur from June 1 to November 30th of each year. This hurricane "season" is the time when all coastal residents and vacationers should keep an ear to the local National Oceanic and Atmospheric Administration (NOAA) weather radio station and an eye on the "Weather Channel" (if you have cable TV) even if you are on vacation. The reason for this concern is that the National Weather Service can only post a "Hurricane Watch" within 24-36 hours of approaching hurricane conditions and a "Hurricane Warning" for specific areas within 12-24 hours of the storm. With the high population density of our shore areas during hurricane season, this is not much time for people to hear the warning, board up their homes, remove valuables, pack the car, pull the boat out of the water and travel away from the coast to the mainland and higher ground.

Major hurricanes are relatively rare events at any location but none of our coastal areas are immune. "We haven't had a hurricane in years" could be the most dangerous words

you'll ever hear. It is best to be prepared. This could be the year!

Once formed, the reason you must take each storm seriously, even though your friends or relatives may have weathered previous storms without evacuating, is the very uncertain and unpredictable nature of these storms. Hurricanes have been known to speed up or slow down without warning, turn around on themselves or hook into shore without warning—all within a matter of hours. Yet the National Weather Service cannot predict these movements. They can only watch their radar screens and tell us what looks to be the next 12 hours of movement. This fickle movement was the reason that the Weather Service began naming hurricanes with women's names in the 1950's. This continued until the 1980's, when they began alternating men's and women's names because both men and women are known to change their minds!

Damage from hurricanes can vary from minimal to catastrophic (Table 1). Two men from the National Weather Service developed a scale to classify these storms. Examine the numbers for winds and storm surge—they are sobering. Even a Class 2 hurricane will have wind velocities in the 100-mile per hour range! And the elevations for the storm surge are frightening. The storm surge is a large mounding up of the ocean's surface with huge



waves on top of it! When the surge comes ashore, often rapidly, it resembles what we would imagine a tidal wave would look like and floods everything in low-lying areas. Due to incredible winds, huge waves which erode beaches and dunes, and the surge which can wipe away cars, trees and houses, it's no wonder that the aftermath of a Class 4-5 storm looks like an atomic bomb had hit.

### Critical Variables

There are other variables that can affect storm damage. An important one is the stage of tide when the storm hits. There will be a significant difference in damage if the storm occurs on high rather than low tide or regular rather than "spring" or lunar tides. On the New Jersey shore this is a difference of about 3.5 feet for regular tides and 5-6 feet for the spring tidal range. When the surge and waves are added to a spring or very high tide, the difference can mean life and death. Hurricane Gloria in September of 1985 was a recent example of time and tides. A very large storm, due to its sudden acceleration off the coast of Delaware, the storm passed by New Jersey on spring low tide. Even with the decreased tidal elevations, there was serious beach erosion but not as severe as it could have been had the storm not accelerated at just the right time.

Another critical variable is location of the shoreline relative to the path of the storm. If one were to divide the storm into four imaginary quadrants, the right upper quadrant is the very worst place to be. There the advancing storm pushes up the surge even higher and the winds are moving into the shore at their strongest velocity. Again using Hurricane Gloria as an example, the storm paralleled the New Jersey coast without hooking ashore, thus saving us from the worst fury of the storm which was felt when it slammed into Long Island, Connecticut and Rhode Island.

The unique existence of the hurricane's eye is another danger point for coastal residents. As the storm advances and begins to pass, [depending on our location] we may experience the relative calm of the eye. Often experiencing rays of sunshine and much decreased winds, uninformed residents think that the storm is over and come out to see what the storm has wrought. The only life lost in Hurricane Gloria was a young man riding around during the latter part of the eye whose car was crushed by a falling tree as the winds again accelerated.

A summary story which shows how unpredictable hurricanes are and why they

should be treated with respect is the experience from a community in Monmouth County during Hurricane Gloria. Because of the predictions that Gloria could have been the "storm of the century," many network and local newspeople were stationed "live" at strategic locations along the shore. When these people reported that it was clearing and the viewers could see the breaks in the clouds and sunshine, they implied that the storm was over rather than informing the viewers that it was only a temporary clearing area between "tails". Many viewers then flocked to the coast to watch the waves and see what damage they could see. Due to the very rapid acceleration of the storm to the north, the storm actually ran over its surge.

### 95,000 Evacuated

For example, in Monmouth County, the highest waters of the storm came in quite suddenly after the clearing in the eye had begun and before the very strongest west winds of the other half of the storm began. In one community, a police car, riding on sections of the undamaged boardwalk to keep the curious "storm watchers" back from the heavily eroded beach, was picked up by the surging waters with the boardwalk underneath and unceremoniously dumped landward. Although not injured, both policemen were very surprised by their unexpected ride. It was about this time that the winds shifted and the highest velocity winds of the storm occurred, downing trees and power lines and catching the bystanders without shelter.

Over 95,000 people along the New Jersey shore were evacuated before Hurricane Gloria hit us in September 1985. No one could predict that it would later accelerate so fast and at such time that it bypassed the shore at low tide. Although beach erosion and flooding was not as severe as the March 1984 northeast storm, Hurricane Gloria was classified as a weakening Class 2 storm by the Saffir-Simpson scale.


Never knowing in which year a severe hurricane will hit, we must therefore be ready each year for the whole hurricane season because they often come in swarms. One of the best nuggets of advice we could give is to keep your ears and eyes tuned to the weather, take each warning seriously, and evacuate early! Be sure that you have first checked the antifreeze and water levels in the radiator of your car. You don't want to be the one whose car breaks down and holds up the entire population evacuating from the island or low-lying areas as the hurricane bears down on us all! 

TABLE 1

## Saffir Simpson Hurricane Scale

Classification	Storm Surge (ft.)	Velocity (mph)	Pressure (millibars)	Class				
				1	2	3	4	5
minimal	4 - 5	74 - 95	980					
moderate	6 - 8	96 - 110	965 - 979					
extensive	9 - 12	111 - 130	945 - 964					
extreme	13 - 18	131 - 155	920 - 944					
catastrophic	greater than 18	155	less than 920					

Source: NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NWS SOUTHERN REGIONAL TECHNICAL REPORT 2.

# New Jersey Treefrogs



Spring Peeper

Pine Barrens Treefrog

Spring Peeper  
on finger.



BY MARK WARNER

New Jersey's acid bogs and swamps provide a diverse habitat for all kinds of wildlife, including the dozen or so species of frogs found in the state. Of these, three are highly specialized treefrogs and belong to the genus *Hyla*. Treefrogs are different from other frogs in possessing adhesive pads, or discs, at the tips of their toes. These enable the tiny amphibians to get off the ground and climb bushes and trees.

In addition to discs, treefrogs have an extra joint in their leg. This intercalary cartilage helps the treefrog in lifting the pads to break

adhesion and also serves to cushion the blow when landing from a jump. This cartilage also acts as a swivel joint when attaching the pads to various surfaces.

Like all frogs, treefrogs must come to water to breed. Eggs are deposited to become floating masses or are attached to underwater vegetation. Tadpoles emerge within a week or so and are strictly vegetarians, feeding on algae found in the water. After a month or so of development, the legs are formed and shortly thereafter the young frog will leave the water and become a land dweller.



An interesting development takes place when young frogs and treefrogs leave the water—they become meat eaters and will spend the rest of their lives searching for mosquitos, gnats, black flies, ants, small spiders and other small insects. Worms, insect larva and practically anything they can fit into their mouths become fair game.

In the spring, the first of New Jersey's treefrogs to make its presence known is the tiny spring peeper, *Hyla crucifer*. Smallest of the true treefrogs found in North America, spring peeper males are only about 3/4" in length with the females about 1 1/4". These treefrogs are common throughout the eastern half of the United States. In color, spring peepers are usually a light brown with some slightly darker and once in a while will have a dull reddish cast. They are very slender with pointed snouts and all have a distinctive dark "X" on their backs. Shy and elusive, spring peepers are very alert and quick to leap away when discovered.

As soon as the last of spring ice has melted, male spring peepers make their way to any available water—swamps, ponds, bogs, temporary flooded areas and begin calling for mates. Their shrill "peeping" calls can be heard for a quarter of a mile or more and up close, their choruses are deafening. The males inflate a sac in the front of their throats and by moving air across their vocal cords they are able to produce their distinctive sounds. The object is to attract a mate and the females are drawn to the water for breeding. Which particular male a female chooses seems to depend on the strength of the call and the position of the male at the site.

Spring peeper eggs are practically impossible to find as they are tiny (no bigger than a newspaper sized period) and are generally laid singly or in small clumps of only a half dozen or so. By June, the tiny froglets can be found leaping about the edges of their watery beginnings, actively seeking their meaty meals.

Adult spring peepers leave the water shortly after mating and spend the rest of their lives as carnivorous land dwellers. Except for mating in the spring of the year, they can be found practically anywhere—on the ground, in gardens, among mosses and leaves, in trees and bushes, on the sides of houses and even on window glass.

Spring peepers are one of the last frogs to go into hibernation and are often heard plaintively peeping well into November. As the breeding season is long gone, perhaps these last calls are nothing more than a farewell to warm weather and activity. By December, they are tucked safely away, deep under mosses,

leaves and dead trees, where they will spend the next two months. Depending on the temperature, spring peepers will emerge in February or March and once again joyfully usher in spring with their shrill peeping.


Probably the most famous of New Jersey's treefrogs is the Pine Barrens treefrog, *Hyla andersoni*. Regarded by many as the most colorful of all North American frogs, the Pine Barrens treefrog is a riot of green, purple, white and orange. Less than 2" in length, this harlequin prefers the clear, acid waters of white cedar swamps. They are only found in New Jersey (only in the Pine Barrens) and a few scattered locations in North & South Carolina, Georgia and the Florida panhandle. First discovered at Anderson, N.C., only six individuals had been found anywhere by 1904.

Pine Barrens treefrogs start breeding around mid-May and can be detected by their "quonk, quonk" calls. The breeding season runs into June. Very shy and alert, Pine Barrens treefrogs quickly leap away when approached. Like spring peepers, Pine Barrens treefrogs move out of the water for the rest of the year. Mostly nocturnal, they spend the day backed into a burrow under mosses and wet wood. Pine Barrens treefrogs are considered rare and endangered due to destruction of habitat.

The third treefrog common in New Jersey is the Gray treefrog, *Hyla versicolor*. Appearing from hibernation at about the same time as the Pine Barrens treefrog, the Gray treefrog likes deeper ponds and lakes and can be found around the borders in bushes and low vegetation. The mating call is a melodious trill which lasts for a second or two.

Gray treefrogs are, not surprisingly, gray in color and have rough, warty skin covered with dark blotches. It is sometimes called a tree toad but, in fact, is a true frog. It has the ability to change color to a light brown or green and, with its blotches, can really blend into its surroundings. One of its defenses is to hunker down and remain completely still, invisible even from a few feet away.

Both the Gray treefrog and the Pine Barrens treefrog have a bright orange inner thigh. When sitting, the color is covered up and can't be seen but if they leap away, the quick flash of orange is believed to act as a defense by startling an enemy.

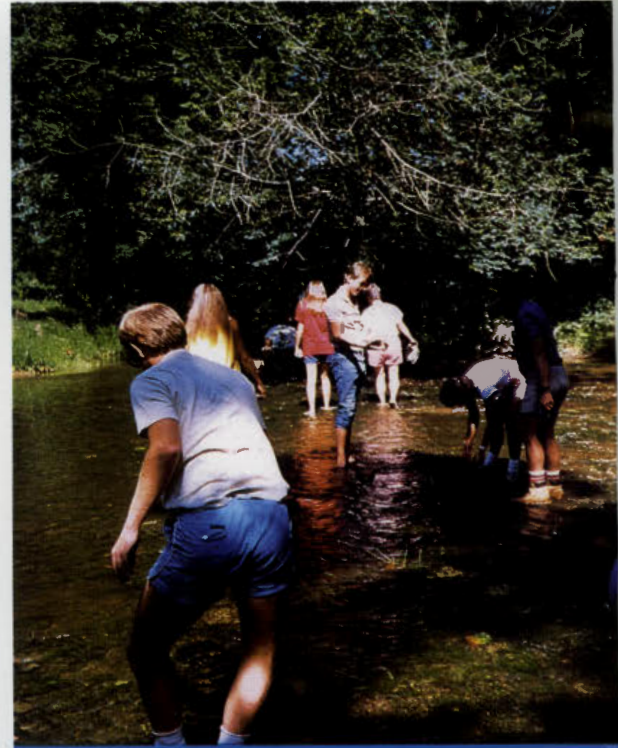
One of the pleasures of spring is to walk a quiet back road at night and listen to the sounds of treefrogs. With lots of patience and a strong flashlight, you might be lucky and spot one of these tiny serenaders, lustily inflating its throat sac and shouting for a mate. It is truly one of the great sounds in nature. 

**Mark Warner**, a former biology teacher and a writer/photographer now living in Connecticut, has been published in *New Jersey Outdoors* from time to time. His photographs were recently published in *International Wildlife* and *Canadian Wildlife*.



Gray Treefrog

# Clean Water is Everybody's Business



Free-lance writer **Helen Lippman Collins**, a regular contributor to the *New York Times*, has been published in *New Jersey Outdoors* several times.

BY HELEN LIPPMAN COLLINS

The message in the title is at the heart of a new state program that encourages citizens to become adoptive parents—taking custody, not of a baby, but of a stream, lake, river, wetland, beach, or lagoon.

If you're wondering what it means to adopt a body of water, you're not alone. None of the New Jerseyans who have done just that knew either until last fall, when DEP's Division of Water Resources, led by Public Participation Coordinator Judy Morgan, officially launched its Water Watch program.

Since then, more than 28 groups, ranging in size from five to well over 800 members, have joined the program, each taking custody—complete with adoption papers—of its very own water resource. Though each group participates in Water Watch in a unique way, each shares a common goal: To take on some of the responsibility for its adopted body of water, by learning about it, educating other members of the community about it, and, most of all, by protecting it and improving it.

With some 6,500 miles of streams and rivers and 61,000 acres of lakes in the state, each group has no dearth of water resources to

choose from. A group can select any of a wide array of environmental activities and a variety of participation levels as well.

The fourth, fifth, and sixth graders in Ruth Pace's class at the Montessori Children's House of Morristown are the youngest members of Water Watch. They've adopted Speedwell Lake—it's actually a widening in the Whippany River that runs along Patriots Path. They're not out to be whistleblowers, Pace explains, but to learn as much as they can about the lake and its surroundings. So far, they've kept a diary of birds along the lake—they've seen great blue herons, kingfishers, and woodpeckers—cleaned up the area, and brought back specimens of water to study under a microscope. They plan, too, to research the history of the lake, which was once dammed up and used to supply power for plants in historic Speedwell Village. Eventually, they'd like to get permission to take a canoe trip along the water.

Other groups, such as the Princeton Avenue Civic Association in Brick Township—they've adopted the Metedeconk River, which empties into Barnegat Bay—take a more active role. Upset by the pollution that forced the closing of beaches last summer, they've sent question-



A group of Water Watchers inventorying a stream.

naires to homeowners and marina owners along the river. They're investigating allegations that boaters caused the bulk of the pollution in their area, and they're determined to find the source and stop it. They're also hoping to keep open a 22-acre plot known as Windward Beach, an area in Brick Township that was forced to close 20 times last summer.

The 350 members of the Hackensack River Coalition, who unofficially adopted the river well before Water Watch came into existence, may be Water Watch's most serious environmentalists. Their watchful eye has often led to calls to the members of the DEP's enforcement division—"they're like a police force for water pollution," says vice president Steven Ohrwaschel—and ultimately, to plant closings and developers being stopped from dumping into the river.

Long before they joined the Water Watch program, they knew about the state's emergency hotline that citizens can call to report an environmental emergency, such as a fish kill, oil or chemical spill or leaking sewage. They also knew what other adoptive 'parents' are just beginning to learn: To contact the local health department or Regional Enforcement Office with immediate but significant pollution problems.

That's just one example of what you'll learn if you contact the Division of Water Resources about starting a Water Watch group of your own. You'll receive a packet containing *The Clean Water Book*, a guide to reducing water pollution in your home and neighborhood. It discusses major industrial sources of pollution, such as burying waste chemicals underground or disposing of sludge in the ocean. But it points out that much of the pollution in our state's waterways—"more than half," according to Judy Morgan—comes, not from industrial waste and sewage, but "from chemicals from our own medicine cabinets, our yards, and our cars." The book has this startling fact, that one single quart of motor oil can potentially contaminate a million gallons of water. And it offers tips that each individual can follow to stop such pollution, known as 'non-point source' pollution because it isn't released from specific points such as pipes.

Along with the *Clean Water Book*, your packet will also contain the Water Watch Resource Manual, which has step-by-step directions for starting your own group. Selecting a resource is the first step. Contacting friends, neighbors, and anyone else who can help: Water specialists at local universities or colleges, for example, nearby farmers, and park information managers. Inventorying the

body of water, by drawing up a map complete with construction sites, farms, housing developments, and any other major facilities, is next.


Then, you're urged to assign goals and plan activities: These include inventorying the area's flora and fauna, developing a nature trail, or planning recreational events such as hiking, canoe trips, or fishing. Inventorying the fish living in the water, with the help of the Division of Fish, Game & Wildlife's Bureau of Freshwater Fisheries, is another suggested activity, and one that can tell you a good deal about the health of your waterway.

Steve Orwaschel, for instance, reports that striped bass have returned to the Hackensack River and are beginning to breed there. That's a sign that his group is achieving its goal of helping the river become a pleasant place again, after years in which it was dismissed as a completely polluted, unredeemable resource.

However, Orwaschel and the other members of the Hackensack River Coalition spend more time watching the river—and lobbying to protect it—than watching the fish that are in it. They regularly walk along the river—it runs for some 30 miles from the Oradell Reservoir to Newark Bay—and contact local authorities, DEP officials, or other members of the coalition anytime they detect problems.

They, like a number of Water Watch groups, are concerned about development along their body of water. Their aim is to have a 'river corridor'—a 100-foot buffer zone where no new development would be allowed.

Other groups keep a constant vigilance as well. The members of the Berkeley Shore Homeowners Association in Bayville have adopted Sloop Creek, another tributary that runs into Barnegat Bay. The 600 members of West Milford's Informed Citizens for a Safe Environment have custody of a 15-mile strip of the pristine Pequannock River, and they regularly contact Newark to report dumping on the property of the Newark watershed. The persistent efforts of the members of the Princeton Avenue Civic Association brought about greater controls or development on the waterfront in Brick Township, thus reducing the potential for pollution.

"Water Watch programs—both here and in many other states around the country, especially on the East Coast." Judy Morgan points out, "are an up-and-coming thing." Getting citizens involved and working with local and state government programs to protect our water resources, she points out, means we have many more pairs of ears and eyes. 

*The Revolutionary War's*  
**Longest Day**

BY ALLEN G. EASTBY



Reenactment of a  
Revolutionary War  
battle scene.

PHOTOGRAPH BY JOHN MARCHETTI



At three o'clock on the morning of June 28, 1778, the drummers beat *Reveille*. As the officers and men of the "advanced wing" of the Continental Army rolled out of their blankets and stirred smoldering cookfires into life, they knew that today, at last, would be "battle day." Before the sun set, they would meet the British army.

For ten days, since their commander-in-chief, George Washington, had ordered them to break their camps in Pennsylvania, the Continentals had been pursuing the King's troops along the dusty roads of New Jersey. The weather had been unbearably hot. Even the frequent fierce thunder storms had brought little relief. But as the men of the Continental Army waited for the drummers to beat the *General*, the signal to march, the thirst and blisters of the last days were forgotten.

For the British troops camped along the roads stretching north and east from the Monmouth County Court House, the last ten days had been filled with bitterness and the sour taste of retreat. During the preceding autumn, the King's men had time and again defeated the enemy army. The American rebels' "capital" city, Philadelphia, had fallen. During the winter, the British had waited for the rabble opposing them to break up. Nearly two thousand rebel soldiers had died during the winter, and two thousand more had deserted. But when spring returned, bringing with it good campaigning weather, the rebel army was still encamped on the barren hills near a place called Valley Forge. And daily the rebels were growing stronger as recruits from Maryland and Virginia, New England and New York joined, as wagon trains of food and clothing and ammunition wended their ways across the greening Pennsylvania countryside, and as a curious and somewhat comical former captain in the Prussian army, who styled himself Baron von Steuben, taught the rabble the latest European tactics.

Then came the news that stunned even the most phlegmatic British officers: France had recognized the independence of the rebellious colonies and had declared war on Britain. A powerful French fleet was on its way to American waters. There were now two enemies to face and so it was necessary to concentrate the King's forces in and around New York City. Philadelphia, then, had to be abandoned. Since there were not enough ships to carry the whole British force to New York, the bulk of the royal army, led by its newly appointed commander, Lt. Gen. Sir Henry Clinton, slipped across the Delaware River and began trudging through New Jersey.

At daybreak on June 28, 1778, the British knew the rebels were close—there had been

frequent, and bloody, clashes with militia, riflemen, and troops from the New Jersey line during the past several days. But they didn't realize that nearly five thousand Continentals with orders to attack were on the roads leading toward the Court House. And neither rebels nor redcoats knew the Revolutionary War's longest day of battle had begun.

By noon, the Continentals had reached the Monmouth County Court House. Already the temperature had soared to ninety-six degrees, but the men were buoyed by the prospect of "scalding the hearts out of" the King's troops. The commander of the "advanced wing," Lt. Gen. Charles Lee, an experienced and competent officer who had rejoined the army in April after spending eighteen months as a British prisoner, ordered his regiments forward to engage and hopefully destroy the enemy rearguard.

As the Continentals tramped north from the Court House, the British rearguard deployed for battle and Sir Henry Clinton halted a major portion of his army, turned it about, and marched for the Court House. The Battle of Monmouth had begun.

What followed next is shrouded in controversy. Neither the participants nor modern historians agree on what happened. But during the course of confused and bitter fighting, two brigades of Continentals retreated, without orders. With more and more British troops entering the battle, the rest of the rebels' "advanced wing" also fell back. The soldiers and many of the regimental commanders could see no reason for the retreat. But once it had begun, no one, not even Gen. Lee, could stop it.

One of Lee's subordinate commanders, the Marquis de Lafayette, spurred his tired horse into a gallop and headed west, seeking the one man he thought could bring order out of chaos and stop the retreat: Washington.

As the sweating and swearing Continentals shuffled through the heat and dust, Lee and his officers, particularly the feisty Pennsylvanian Anthony Wayne, quarrelled, accusing each other of responsibility for the retreat.

The pursuing British light infantry and light cavalry derisively sounded their hunting horns.

Near the present site of the "Molly Pitcher Spring," the retreating Continentals encountered Washington. The commander-in-chief berated Lee (some say he swore a "blue streak") and then organized three regiments (13th Pennsylvania, 3rd Maryland, and 4th New York) and a battery of artillery (Eleazar Oswald's Battery Of "the Lambs," Col. John Lamb's Regiment of Continental Artillery) to hold off the British while the main army

**Allen G. Eastby**, a published historian and trout angler, has appeared on our pages many times.

### Learning More About the Battle of Monmouth

The following list of recommended books will help you to learn more about the longest day of battle during the Revolutionary War.

Billias, George (editor). *George Washington's Generals*. New York: 1964.

Billias, George (editor). *George Washington's Opponents: British Generals and Admirals in the American Revolution*. New York: 1969.

Smith, Samuel. *The Battle of Monmouth*. Monmouth Beach: 1964.

Stryker, William. *The Battle of Monmouth*. Port Washington: 1970 (reprint of 1927 edition).

Thayer, Theodore. *The Making of a Scapegoat: Washington and Lee at Monmouth*. Port Washington: 1976.

Wickwire, Franklin and Mary Wickwire. *Cornwallis: The American Adventure*. Boston, 1970.

Willcox, William. *Portrait of a General: Sir Henry Clinton*. New York: 1962.

deployed. Command of this detachment was given to Anthony Wayne.

When he realized the rebels were no longer fleeing, Sir Henry Clinton ordered his elite formation, the Brigade of Guards, forward. The Guards were beaten back, in fierce fighting, by the Pennsylvanians and Marylanders. Then Clinton ordered his cavalry, the Queen's Rangers and the 16th Light Dragoons, to outflank the rebels. When the horsemen circled to the south, the 4th New York began to fall back. As they neared Weamaconk Creek, the Yorkers encountered a small brigade of New England Continentals (4th and 8th Connecticut and 2nd Rhode Island Regiments) and together they formed up behind an overgrown fence (it is usually called the "Hedgerow") where they were shortly joined by Wayne's other two regiments.

At least twice, and perhaps as many as six times, the British attacked the Hedgerow. Each time they were thrown back. While the fighting at the Hedgerow raged, Washington, ably assisted by Lafayette and Baron von Steuben, deployed the main Continental army. Once the battle line had been formed, Washington ordered the troops at the Hedgerow to fall back across Weamaconk Creek. It was now 3:30.

Over the next two hours, Clinton staged three attacks on the rebel position.

The first attack, led by Lord Cornwallis and spearheaded by a battalion of Grenadiers and the 33rd Foot, was directed against the rebels' southern flank. Enfilading artillery fire from a rebel battery on Combs Hill drove the redcoats back. For Cornwallis, the most able of the King's commanders, it was not only humiliating but heart rending to see the proud and cherished soldiers of his own regiment, the 33rd, shot to pieces by the rebel cannon.

As Cornwallis' troops retreated, Clinton sent in another attack, this one against the rebel center. A brigade of Continentals (2nd and 11th Pennsylvania Regiments and Col. Malcolm's Continental Regiment) under the command of Lt. Col. Aaron Burr, met the British thrust and stopped it. When Burr counter attacked, his men, in turn, were driven back. To give Burr a chance to reform, the 1st New York came forward and began to practice the Baron von Steuben's manual of arms in plain view of the British. This act of bravado distracted the British long enough to allow Burr to rally his men. It also cost the Yorkers heavy casualties since the British concentrated their artillery fire on them.

The next British attack was an attempt to turn the northern flank of the rebel position. A brigade of redcoats, led by a battalion of light infantry and the 42nd Foot (the Royal High-

landers), advanced from Craig's House toward the rebel lines. The commander of the "left wing" of the Continental Army, Maj. Gen. William Alexander of Basking Ridge, New Jersey (known to friends and foes as Lord Stirling), called on three of his best regiments, the 1st Virginia and the 1st and 3rd New Hampshire, supported them with a Massachusetts brigade, and beat back the attack.

It was now 5:00.

Once the British attacks had petered out, Washington launched a series of counter thrusts.

In the center, Anthony Wayne led three Pennsylvania regiments (1st, 3rd, and 7th) against the British Grenadiers. The Pennsylvanians and the Grenadiers fought bayonet to bayonet and hand to hand across Weamaconk Creek. The hard pressed redcoats were driven back until Cornwallis led the 33rd Foot forward. For the second time, the rebels made a stand at the "Hedgerow." But in this instance, the 33rd, with a massed battery of over a dozen cannon firing in support, were able to dislodge the stubborn Continentals.

As the shadows lengthened, the rebel attacks continued.

Along the northern flank, the 1st and 3rd New Hampshire Regiments advanced and caught the Highlanders as they were beginning to retire toward the main British battle position. The fight was short and sharp. But both sides were exhausted and in the growing twilight the British were able to break off the action.

In the center, a Virginia brigade (3rd, 7th, and 15th Virginia Regiments) and the regiments of the North Carolina Line crossed Weamaconk Creek and reoccupied the Hedgerow position.

It was now 7:30.


Utter exhaustion, the lack of ammunition, and darkness had at last stilled the cannon and quieted the rattle of musketry. Both armies settled down to spend the night on the field of battle.

Later, in the dark hours after moonset, Sir Henry Clinton ordered a retreat.

The two armies had suffered heavy losses, how heavy it is impossible to say since after battle reports made by both sides during the American Revolution were carefully edited for propaganda purposes. But by the strict and stylized rules of eighteenth century warfare, the rebels had won the Battle of Monmouth since they held the battlefield. However, Sir Henry Clinton and most of his officers told themselves—and the government in London—that they had fought a successful rearguard action and had soundly trounced

PHOTOGRAPHS ON THIS PAGE BY JUDY DOGGART

the rebels. Lord Cornwallis knew better. Never again would the best British field commander trust his superior. Never again would Cornwallis and Clinton see eye to eye, on anything. On a sweltering day in central New Jersey, the feud that led to the bumbling, fumbling, and stumbling British strategy of 1780 and 1781, and to the defeat of the King's army at Yorktown, began.

For Washington, the battle of Monmouth was a disappointment. The Continentals had done well, after a bad start. The British had been hurt. But the clear, clean victory the commander-in-chief ached for had eluded him. Yet the battle had a meaning for him that Washington never truly perceived. The Revolutionary War's longest day of combat was the last time a King's general risked a full scale battle against an army under Washington's command. It also marked Washington's achievement of mastery over the hearts and minds of the Continentals. When the commander-in-chief had appeared out of the pall of dust smothering the Tennent Church-Court House Road, fear was dispelled, thirst was forgotten, exhausted men found new strength, and dispirited regiments formed ranks. No one who was there on that day of battle would ever forget how Washington had transformed defeat and retreat into victory. 



*Visitors Center at Monmouth Battlefield State Park.*




*An encampment reenactment at Monmouth Battlefield.*

## Monmouth Battlefield Today . . .

The Battle of Monmouth is commemorated by Monmouth Battlefield State Park. Easily reached off U.S. Route 9 and N.J. Route 33 west of the town of Freehold in Monmouth County, the 1,520 acre park features a visitors' center (with interpretive displays), the Craig House (built in 1710 and being restored), 25 miles of hiking trails, and two picnic areas. There are frequent special events (contact the park office for dates and activities: RD #1, Box 258, Freehold, NJ 07728; 201-462-9616).

Two hundred years have wrought changes to the ground over which rebels and redcoats fought on that sweltering June day in 1778. But standing on Combs' Hill (the site of the Visitors' Center), you can *almost* see the British grenadiers and Guards advancing, and you *can* hear the men of the Continental artillery swearing as they wrestle their cannon into position. If you walk along the old Freehold and Jamesburg Railroad line and pause where the railroad crosses Weamaconk Creek, look out to the southwest. There, before you, is the scene of the "stand at the hedgerow." If you follow the railroad west, you will come to the spot (it is unmarked) where the 1st New York formed, letting themselves be targets for the British artillery, and protecting the other regiments of the Continental Line as they rallied. Along the rail line to the east, near the intersection of Wemrock Road and County Route 522, is where Charles Lee and George Washington had their first heated exchange of the day. The northern boundary of the park is marked by McGellairds Brook along which the New Hampshire Continentals fought the Royal Highland Regiment, the Black Watch, and drove them back.

No matter where you walk in the park, once you escape the road noises, the only sound to disturb the birdsongs is a faint, far-away rattle. It is the echo of drums. 

Clare C. Cullen  
607 Pine Street  
Newtown, NJ 08844



## Dear Editor

### EXPLAIN PLEASE

I have in my hand my copy of N.J. Outdoors Vol. 15 "The 15th Anniversary" issue, but it fails to clarify why it is Vol. 15 and 15th Anniv. Why do I ask this? Well I've been a subscriber to the progenitors of the present N.J. Outdoors for between 45-55 years. I'm not sure when I first received the mimeographed sheet that was being distributed from Trenton back about the time I graduated from Woodbury High School in 1939.

Without organizing an archeological expedition into the attic to see if I've buried any prehistoric relics there I've come up with a copy of NEW JERSEY OUTDOORS VOL. 13 NO. 4 published by Div. of Fish and Game, Dept. Conservation and Economic Development dated Oct. 1962. My rather vague recollections are that the mimeograph action was put on hold by WW II. Sometime after 1946 the Fish and Game people reorganized the publication N.J. Outdoors. If the volume number is an accurate indicator this would mean Vol. 1 was 1949.

Sincerely  
Bernard W. Koft  
East Brunswick, NJ

### MORE OF THE SAME

Just got my 15th Anniversary issue of New Jersey Outdoors. Wow! What photos of our beautiful state. Can't believe they are all in NJ, except that I have been to every place you pictured—must have been riding around without seeing.

Wrote you a letter a while back about when your "little" magazine was the size of Readers' Digest—maybe as much as ten pages!

One question, Editor, what is this "15th" Anniversary?

I have been getting NJO for thirty years at least—maybe forty?

Say hi to Carol Decker and bravo for her painting of old Porky. I'm afraid to touch the page—gonna get one of those quills in my finger.

Bill Terrill  
Warren, New Jersey

### 15th ANNIVERSARY ISSUE EXPLANATION

*You're both right on target. Beginning with the January/February 1974 issue we introduced a new series of New Jersey Outdoors, up in size from the 6" x 9" old format and with full color on the covers and inside pages. I proposed those changes in late 1973 and began my editorial career with that first issue, Vol. 1, No. 1, January/February 1974. A new series is usually renumbered in this manner.*

*The 15th Anniversary issue (January/February 1988) is just that—the 15th Anniversary of this series of New Jersey Outdoors. It is also my 15th Anniversary as Editor, and sometime this year I will turn over the editor's chair, pencils, photo files, story files, dictionary, style book, blessings and whatever to my successor. And I hope you all hang in there with him as you have hung in with me.*

Your 15th Anniversary Issue is marvelously poetic. For me it brought back 21 years of fond memories. It is a tribute to a great state, to a great people, and to a dedicated, hard working editor.

Ron Price  
Natick, Mass.

Because we are short-staffed here, I have been checking in our periodicals. In this way I have become acquainted with *New Jersey Outdoors*.

It is a marvelous magazine! The pictures are smashing, the articles are informative—you and your staff should be very proud.

Sincerely,  
Z. Moberg, Librarian  
Government Publications  
Department  
City of Philadelphia

New Jersey Outdoors welcomes letters from readers. Letters for publication should include the writer's name and address and should be mailed to: Editor, New Jersey Outdoors, CN 402, Trenton, N.J. 08625. Letters may be edited for reasons of length or clarity. Please keep the letters coming. We'd like to hear what you think about the magazine. We'll also try to answer questions and if we cannot, we'll ask our readers for help.

### SEA SHELLS, ANYONE

As a reader of N.J. Outdoors for many years, I am turning to you for information.

Over the years I have been a collector of sea shells and have a sizeable number from both Atlantic and Pacific coasts, Indian Ocean, etc., all properly named of course.

As I have moved to an apartment, I no longer have space and would be glad to present them where they could be used educationally.

There must be an institution in the state where they could be used in classes or for display.

Elizabeth Case

*Schools, libraries, interested in sea shells? Write to: Elizabeth Case, 32 Liberty St., Newton, NJ 07860.*

### NJO BACK ISSUES

It was some time in late '76 or early '77 that I pestered you for a copy of N.J. Outdoors because my missing copy was lost, strayed or stolen. It took me two letters to convince you to send me the missing issue. You finally relented but reluctantly. You advised me that someone else would now be short an issue if they needed one.

At that time I told you that if I would some day dispose of all my copies of N.J. Outdoors you would be so advised and be given first choice of acceptance or refusal.

Be advised that I have N.J. Outdoors from the Sept./Oct. 1975 issue to July/August 1985 issue complete and you are welcome to same if you want them. The weight is 20 lbs. which includes the box. Please advise shipping instructions if you are interested. If you do not wish these magazines, I will merely dispose of them.

Sincerely,  
John R. Hartman

*We have file copies, but maybe our readers would be interested. If so, write to John R. Hartman, 404 South Egret Circle, Barefoot Bay, Fl. 32958.*

# Calendar of Events

DEP's Division of Environmental Quality is currently improving Air Permit information. Here is the new toll-free information number that can be called during regular DEP business hours:

**1-800-441-0065**

This number is for AIR PERMITS INFORMATION ONLY, and is available for New Jersey callers only.

## MAY

- 9 NEW JERSEY CLEAN WATER COUNCIL: "UPDATE 1988—NEW DEVELOPMENTS IN NEW JERSEY'S WATER RESOURCES PROGRAMS" at The Berkeley-Carteret Hotel from 8:30 AM to 3:45 PM, 824, including lunch. Topics include the new septic system regulations, ocean issues, ground water standards, and compliance of wastewater treatment facilities. Division of Water Resources (609) 633-3717.
- 10-12 GOVERNOR'S TOURISM CONFERENCE, Trump Hotel/Casino. For Registration Information, call the New Jersey Division of Travel and Tourism at (609) 292-2496.
- 18 FRESHWATER WETLANDS CONFERENCE, Sponsored by the New Jersey Conservation Foundation and held at the Woodrow Wilson school on the Princeton University Campus. Call 201-539-7540 for information.
- 21, 22 TERHUNE ORCHARDS KITE DAY. Bring your own or make one here. 10:00 AM-5:00 PM. Celebrate Spring in the Country. Events include live country music, clowns, scarecrow making, exhibits, barn animals, pony rides plus many more activities for the whole family. Admission \$1.00, children under three free. (609) 924-2310
- 22 NATURE DAY. Flatrock Brook Nature Center. (201) 567-1265.
- 28 FULL MOON HIKE: "Sounds of Spring". A 5½-7 mile hike north of Atsion Ranger Station starting 7:45 PM. Bring lunch and flashlight. (609) 267-7052.

28-30 "SEASON SAMPLER" COLD SPRING. Spinning, weaving, quilting, blacksmithing and more! Also, militia re-enactments. At Historic Cold Spring Village. 10 AM to 4 PM \$1.50 Admission. (609) 884-1810.

28, 29, 30 MEMORIAL DAY WEEKEND—The East Coast Stunt Kite Championships, on the beach in Wildwood, New Jersey. Contact Fran Gramkowski at 609/429-6260.

## JUNE

- EVERY WEEKEND IN JUNE—OPEN HOUSE HORSE FARMS—MONTH OF THE HORSE Write the NJ Dept. of Agriculture—Horse Programs, CN 330, Trenton, NJ 08625.
- 4 8th ANNUAL CANOE JAMBOREE, TURKEY SWAMP PARK, FREEHOLD TWP. Monmouth County Park System, in conjunction with the Jersey Paddler and the Ocean County Parks Department, has designed this event to promote canoeing and kayaking and introduce the latest paddling equipment to the public. (201) 842-4000.
- 5 STRAWBERRY-TIME BIKE RIDE, Burlington County. 21 miles. 10:30 AM. An easy, mostly level route in prime rural area in Mount Holly. Bring snacks and beverages. A strawberry treat awaits riders afterwards at leader's home. (609) 267-7052
- 11 FREE FISHING DAY. 10:00 AM-4:00 PM. This is a statewide event in which any person of any age may fish without a license (all other rules apply) Special events taking place at Pequest include spin casting and fly-rod casting classes for beginning anglers. (201) 637-4125.
- 11, 12 "MARINE MUSEUM DEDICATION/ANTIQUÉ FISHING COLLECTIBLES SHOW" Cold Spring. Official opening of the Cape May County Marine Museum. Over 25 regional dealers in rods, reels and lures. Sea Shanty Group. At Historic Cold Spring Village. 10 AM to 4 PM \$1.50 Admission. (609) 884-1810.

18 A DAY IN THE COUNTRY. H.O.P.E.—Help Our Preservation Effort is sponsoring a house/garden tour; professional art show and sale; 18th Century music and costumed guides at the historical Village of Hope. For directions, ticket information and a free brochure, call 201-459-5381 or 201-362-6210.

18, 19 SPRING FESTIVAL—Tewksbury Wine Cellars will host their annual Spring Festival on Father's Day Weekend from 12-6 PM at the winery. The event will include winery tours, wine tasting, food, country music, hayrides through the vineyard and local crafters. Admission is free. Parking is free. Rain or shine. A family event. For additional information or directions please call 201-832-2400.

20-22 SPRING AUDUBON WEEKEND. City of Cape May. (609) 884-9565.

25, 26 4th ANNUAL HACKENSACK RIVER FESTIVAL. New Bridge Landing Historic Park, River Edge, NJ. Sponsored by the Bergen County Historical Society, the Festival will feature bluegrass, folk, fiddling and other traditional American music, crafts, food, historic house and barn tours, living history demonstrations, and an exhibit of antique fire engines. (201) 343-9492.

25, 26 "IN THE GOOD OLD SUMMERTIME FLOWER SHOW" Cold Spring. See local floral arrangements in a summertime theme! Music by the String Quartet. At Historic Cold Spring Village 10 AM to 4 PM \$1.50 Admission. (609) 884-1810.

26 INNERTUBING: HARRISVILLE-BEAVER BRANCH. 10:30 AM. Two hours of relaxation down the Wading River, plus a 20-minute walk back to the starting point. All participants should wear old sneakers and bring lunch to eat before and after tubing. Children and weak swimmers must wear life jackets. Water depth averages three feet. (609) 267-7052.

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# Ruby-Throated Hummingbird

BY DAVID CHANDA

The ruby-throated hummingbird, also known as ruby-throat, hummer and common hummingbird, is one of the smallest yet widest-ranging hummingbirds in North America. These small bundles of energy are constantly in motion, perching on twigs only briefly to rest.

Hummingbirds with their remarkable powers of flight are the only birds that can fly backward as well as forward. They also hover, staying in one spot while flying, as they sip nectar from flowers.

Through the use of high-speed motion pictures, it has been revealed that when hovering, a ruby-throated hummingbird will beat its wings 55 times per second (completed strokes), 61 times per second when backing up and 75 beats per second when flying straight-away.

An adult ruby-throat is 3-3.5 inches long and weighs about 1/8 of an ounce. Both sexes have needle-thin bills and are metallic green above and gray below. The male has deep fiery red throat feathers and a slightly forked tail, while the female has a white throat, no fork in the tail and prominent white spots on the outer corners of the tail.

The ruby-throated hummingbird mostly winters in an area ranging from Mexico to Panama. They leave their tropical wintering grounds in February or March and move northward, keeping pace with the opening of flowers as the seasons advance. Many will travel more than 500 miles nonstop as they cross the Gulf of Mexico in their northward flight.

Ruby-throats usually reach New Jersey in May. The males tend to arrive slightly ahead of the females and can be found darting in and out of lilacs, columbines, bee balm and a host of other flowers as they feed on the flower's


nectar. In addition to flowers, hummingbirds will feed on tree sap and insects. They have even been known to hover in front of a spider's web and pick out the entangled insects.

The ruby-throated hummingbird begins nesting in New Jersey in June. During courtship, the female sits quietly on a perch while the male performs an aerial dance. In this dance, the male will swing over a wide arc of about 180 degrees back and forth, as though he were on a pendulum. At the bottom of each swing, the male will emit a loud buzzing sound with his wings.

The female will construct a nest in the limb of a tree such as a maple, beech, hemlock or hornbeam. The nest is usually in the open woods and sheltered overhead by leaves. It is built with soft down from milkweed, ferns or thistle and fastened in place with silk from a spider's web or tent caterpillar's nest. The outside of the nest is decorated with lichens and mosses and appears like a small knot about the size of a walnut.

The female lays two white pea-sized eggs in the nest. The eggs hatch in 16 days and the young will leave the nest about 22 days after hatching. The female usually raises two, sometimes three broods during a season.

Hummingbirds are strongly attracted to the color red and will readily come to an artificial feeder. There are many types of hummingbird feeders available commercially, but for the best results in attracting a hummer, you should make sure the feeder has red glass tubes and is filled with a mixture of honey and sugar water.

During October, the ruby-throated hummingbirds once again begin their long migration south. Although they are only in New Jersey for six months of the year, they certainly add to our quality of life, and are a pleasure to have in the Garden State. 

**David Chanda**, Chief of Information and Education, Division of Fish, Game and Wildlife, is a frequent contributor.



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